

FINDING OF NO SIGNIFICANT IMPACT
MISSOURI RIVER DIKE MODIFICATIONS
Woodbury County, Iowa, to Nemaha County, Nebraska
April 2004

I have reviewed and evaluated the documents concerning the proposed Missouri River Dike Modification Project involving the lowering of dikes and construction of chevrons in order to provide "shallow water habitat" (SWH) (<5 ft deep/<2 fps flow velocity) for endangered species as described in the U.S. Fish and Wildlife Service's (FWS) Biological Opinion for the Missouri River. As part of this evaluation, I have considered the following alternatives:


The no Federal action alternative was not selected because it would not provide a means to provide habitat for the pallid sturgeon and would not allow compliance with the Biological Opinion.

The preferred alternative proposes to construct approximately 10 acres of shallow water habitat per mile within a 12.3-mile section of the channelized Missouri River. This would be accomplished within a total of 6 project sites that lie between river miles 715.2 and 529.0 by lowering 85 channel training structures, and constructing 40 chevron structures along inside bends of both the left and right descending banks of the Missouri River. The formulation of alternative means for accomplishing the goal of SWH has taken place in the form of official and unofficial communication between the U.S. Army Corps of Engineers (Corps) and FWS.

The environmental consequences of the Preferred Alternative on the physical, biological, and cultural resources and engineering feasibility have been evaluated. Those factors that were influential in my review included: a) The project is anticipated to improve the habitat value of the Missouri River for fish and wildlife, particularly the endangered pallid sturgeon; b) No long term significant adverse impacts to cultural or natural resources are anticipated to occur; c) Federal endangered and threatened species will either benefit or not be adversely impacted by the action; d) There would be no impacts to privately owned lands along the river, as all projects will only occur adjacent to public lands; e) All applicable Federal and state regulations will be met prior to contract award.

Based on the disclosure of the Preferred Alternative impacts contained within the Environmental Assessment, no significant impacts to the human environment are anticipated. The proposed project has been coordinated with the appropriate resource agencies, and there are no significant unresolved issues. Therefore, an Environmental Impact Statement is not needed prior to proceeding with the proposed Dike Modification Project.

12 APR 2004
Date


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US Army Corps of Engineers
Omaha District

**FINAL
ENVIRONMENTAL ASSESSMENT
WITH
FINAL FINDING OF NO SIGNIFICANT IMPACT**

**MISSOURI RIVER DIKE MODIFICATIONS
Woodbury County, Iowa, to Nemaha County, Nebraska**

April 2004

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ENVIRONMENTAL ASSESSMENT
MISSOURI RIVER DIKE MODIFICATIONS
Woodbury County, Iowa, to Nemaha County, Nebraska
2004

INTRODUCTION

The U.S. Army Corps of Engineers (Corps) proposes to restore approximately 10 acres per mile of shallow water habitat (SWH) in the channelized Missouri River. This would be accomplished within a total of 6 project sites that cover approximately 12.3 river-miles. The sites include the inside bend portions of Snyder Bend in Woodbury County, Iowa (Left Descending Bank River Mile (LDB RM) 715.2-714.7); Winnebago Bend in Thurston County, Nebraska, (LDB RM 710.0-708.7); Desoto Bend and Boyer Bend in Washington County, Nebraska, (RDB RM 644.0-642.0, and RDB RM 637.0-634.0 respectively); Tobacco Island Bend in Cass County, Nebraska, (RDB RM 589.0-586.2); and Langdon Bend in Nemaha County, Nebraska, (RDB RM 531.7-529.0). Lowering 85 channel training structures and constructing 40 chevron structures along both the left and right descending banks of the Missouri River would be the measures used to accomplish this. This proposed project is meant to create a more natural aquatic environment to aid in the restoration of the endangered pallid sturgeon (*Scaphirhynchus albus*) while also maintaining a reliable navigation channel. Figure 1 shows the vicinity of each of the projects.



Figure 1. Vicinity map of the Six Major Dike Modification Projects on the Missouri River

PURPOSE AND NEED

The purpose of the Federal action described herein is to modify dikes and construct chevrons in order to provide a portion of the total 2004 SWH (<5 ft deep/<2 fps flow velocity) goal for endangered species as described in the U.S. Fish and Wildlife Service's (FWS) Biological Opinion (BiOp) for the Missouri River, (FWS 2000, and 2003 amendment). The need for SWH in the Missouri River is resultant of human impacts to the Missouri River, namely, the implementation of the Missouri River Bank Stabilization and Navigation Project (BSNP) and the operation of the Missouri River main stem system of dams for which the Corps has primary operational management. The BSNP and dam operations have negatively affected the river's ability to maintain normal fluvial-geomorphic processes that are supportive to the natural ecological functioning of the river. This has led to a decline in the biotic diversity of the river, and has likely resulted in the listing of three species as federally threatened or endangered. Thus, there is a clear need to re-establish a more natural habitat element to the river to aid in the recovery of threatened and endangered species and the biotic integrity of the river in general. This project, in addition to others that are being undertaken concurrently as separate actions, offers an opportunity to restore habitat diversity on a large-scale basis in the form of increased SWH at a relatively low cost, while maintaining congressionally authorized purposes of the BSNP and the main stem dam system. The other projects being undertaken by the Corps to restore SWH include restoration of the connections of backwaters via dredging at Soldier Bend (LDB RM 660.3), Tyson Bend (LDB RM 653.0), and California Bend, (LDB RM 649.3) and notching of dikes from Sioux City, Iowa to Rulo, Nebraska. The Kansas City District will also be completing SWH in and along the Missouri River from Rulo to the Osage River in Missouri, including activities such as dike notching, pilot chute construction and channel construction. Cumulatively, all of these projects, plus projects that have been recently completed since November of 2003, will provide from 1235-1914 acres of new shallow water habitat. For further detailed information on the other work and its anticipated biological output to the Missouri River, see correspondence inserted at Appendix A of this report.

BACKGROUND

Historically, the dynamic nature of the Missouri River created an environment of braided, sinuous channels, sloughs, chutes, oxbows, sand and gravel bars, alluvial islands, deep pools, and marshlands. Since the early 20th century, the natural fluvial processes of predictable seasonal flooding into over bank areas, cut-and-fill alluviation associated with river meandering, and channel avulsion have been interrupted by efforts to redirect the energy of the river under the auspices of the BSNP and to control the flows through the construction of the dams. This has resulted in a river with a single channel that is maintained along a pre-determined design alignment and with flows that are suppressed in the spring and augmented in late summer. The original channel that once ranged from 1,200 feet to 2 miles wide is now 600 to 1,100 feet wide, with a majority of the water consisting of a deep main channel. This narrowing, along with controlled flows, resulted in the loss of over 100,000 acres of shallow open water habitat and has greatly homogenized the habitat available to riverine species.

The main species of concern in the operation of the Missouri River Projects are the endangered pallid sturgeon (*Scaphirhynchus albus*), the endangered interior least tern (*Sterna antillarum*), and the threatened Northern Great Plains piping plover (*Charadrius melodus*). In the BiOp, the FWS found the current management of the river is likely to jeopardize the continued existence of these species. To avoid jeopardizing these species, the FWS outlines recommended reasonable and prudent alternatives (RPAs) in its BiOp. Specifically, the BiOp, and recent post-BiOp coordination between the Corps and the FWS have led to a 2004 goal of 1200 acres of new SWH to be made available in the reach of the Missouri River between Ponca State Park (near Sioux City) to the mouth of the Osage River by July 1 (RPA element VII.1.b., see official correspondence in Appendix A.). This measure is intended to primarily benefit the endangered pallid sturgeon. The Corps could create sufficient acres of SWH by either lowering flows during the summer months from Gavins Point Dam or by physically constructing the habitat. Flow changes for this purpose are not practicable. By implementing the proposed project (along with other projects that are planned to be completed by July 1), the Corps would be able to provide habitat for the pallid sturgeon while still meeting the authorized purpose of the BSNP and the navigational flows from Gavins Point Dam.

AUTHORITY

It is within the scope of the Corps' current legal authority to implement the RPAs of the BiOp in its operation and maintenance of the BSNP.

ALTERNATIVES CONSIDERED

Only one action alternative was developed for this project and analyzed in this document. The designs of the major dike modifications were developed using information from the chevron structures constructed at Boyer Bend in the early 1990s. The results of the Boyer Bend project indicated a considerable increase in the amount of 0 to 5-foot depths relative to the construction reference plane (CRP)¹ (15 to 25 percent of the section) and a decrease in the amount of 5 to 10-foot deep water, with relatively little change in the average bed elevation (Remus and Davinroy 2001). The layout of structures in the action alternative is intended to provide the greatest potential of SWH development in the shortest amount of time based on lessons learned from Boyer Bend. The formulation of alternative means for accomplishing the goal of SWH in 2004 has taken place in the form of the formerly mentioned study and via recent official and unofficial communication between the Corps and FWS.

A. No Action

Under the no action alternative, restoration of SWH via dike lowering and chevron construction would not take place along the main channel border of the Missouri River. This would not fulfill the project purpose to aid in restoring a portion of the SWH that existed prior to the BSNP. In addition, the Corps would be in the position of either not meeting the

¹ The CRP is a sloping elevational datum, with zero being referenced to an elevation that is inundated 75 percent of the time.

purposes of the BSNP and authorized navigational flows or not meeting the recommended BiOp acreages for SWH.

B. Dike Lowering and Chevron Construction (Proposed Action)

Under this alternative, approximately 10 acres of SWH per mile would be restored within a 12.3-mile section of the channelized Missouri River. This would be accomplished within a total of six project sites that lie between river miles 715.2 and 529.0 by lowering 85 channel training structures and constructing 40 chevron structures along inside bends of both the left and right descending banks of the Missouri River. All construction would take place from either a floating plant or from the high bank. Table 1 lists the details of the locations and modifications to take place at each of the sites, and Appendix B shows typical plan and profile drawings of the dike and chevron modifications.

Table 1. Description of Major Dike Modification Project Locations, expected acres of SWH, and construction details.

Missouri River Major Dike Modification Projects to be Implemented by July 1, 2004							
Location and Acres of New SWH	River Mile	Descending Bank Side	State	# Dikes Lowered	Removed/ Recycled Material (CY)	# New Chevrons	New Stone Required (Tons)
Snyder Bend (10 Ac)	715.2-714.7	L	IA	5	6,520	3	2,466
Winnebago Bend (15 Ac)	710.0-708.7	L	NE	12	15,408	5	4,110
Desoto Bend (30Ac)	644.0-642.0	R	NE	12	13,008	6	5,011
Boyer Bend (40 Ac)	637.0-634.0	R	NE	20	25,680	8	7,398
Tobacco Island Bend (20 Ac)	589.0-586.2	R	NE	16	20,544	8	6,576
Langdon Bend (18 Ac)	531.7-529.0	R	NE	20	33,965	10	7,650
Total for 2004				85	115,125	40	33,211

Dike Lowering: The 85 dikes would be modified by removing rock starting from the riverward end of the dike and extending 100 to 125 feet back into the bank. Removal of material at the bankline and landward will involve "unburying" the dikes via excavation of alluvial material and then removal of stone from the dike. The dikes would be lowered to -5 feet CRP. A total of 115,125 cubic yards of material will be removed from the dike structures. The rock removed from the dikes would be used to construct the chevrons. Excess material (sand, stones, trees, brush, etc.) will be placed just downstream of the existing structure and at least 100 feet landward from the end of the dike excavation, allowing the river to eventually reclaim it through erosion. Any pilings that are in the dikes will be broken off at the desired elevation using an excavator and disposed of by either taking them to a landfill or burying them in an excavated hole with at least five feet of fill placed over top. This disposal will occur at least 100 feet landward from the end of the dike excavation. In order to reach

125 feet into the bank, the construction equipment would likely have to crawl up onto the bank to complete the work at each location.

Dike Lowering Goals:

1. Allow the river to erode the portions of the bank where the rock has been removed in order to increase the top width of the river and create shallow water adjacent to the main channel.
2. The varying elevations would allow a diversity of depths and velocities to be established in order to increase the chances of always having some portion of the modified area within the recommended 0 to 5-foot depth range as river discharges fluctuate.

Chevron Construction: The chevrons are V-shaped rock structures with a gap at the point of the V so that the two sides of the V do not touch. The two sides of the V flare out in the downstream direction forming a 60-degree angle. Because the desire is to maintain open water between the chevron and riverbank, the landward wings need to be short enough to allow a significant amount of flow around the right side of the structure. Assessment of the dike fields indicate an inboard wing length of 75 feet would allow water to circulate between the chevron and the river bank. Each chevron would be placed out from the bank in line with the riverward ends of the existing dikes about half way between the nearest upstream and downstream dikes at any of the 40 locations. The chevrons would be constructed at varying elevations at, or one foot below, CRP. While excess stone from the dike lowering will provide some of the needed materials, 33,211 tons of new stone will be required to construct the new chevrons.

Chevron goals:

1. To direct flows towards the riverbank to create erosion and scour in the areas where the dikes would be lowered.
2. To create deposition of sand bars downstream of the chevrons. It has been shown that a chevron constructed in the proposed configuration will create sandbars that occupy 30 to 50 percent of the length between the two dikes it is constructed between (Remus and Davinroy, 2001).
3. To direct flows toward the navigation channel to prevent the formation of shoals, which could interfere with navigation.

AFFECTED ENVIRONMENT

The proposed project area extends for approximately 12.3 miles of river length over six project sites that are spread across what approximates the entire length of the Nebraska-Iowa border. The project will directly affect areas along the inside bends of both banks of the Missouri River, and includes the river bottom near the banks on both sides of the river, and the high banks where the dikes are located. Once the project is completed, the river would

erode the high bank in the areas upstream and downstream of the lowered dikes. Direct disturbance on the bank would be limited to the rock, soil and piling removal at each dike location. Once the construction is complete, the banks of the river and the spoil areas will erode over time in response to the modifications.

A. Fluvial Characteristics

Historically, the Missouri River flooded into its flood plain on an annual basis and tended to naturally meander within it. As a result, erosion and turbidity were major habitat features, carbon-based aquatic food sources and other nutrients were transported from the flood plain to the river, and the natural fluvial process of the river caused new secondary and tertiary channels to form and degrade in a dynamic equilibrium. The main channel typically had a deep thalweg that contained the highest velocities, and shallower areas were found on one or both sides of the channel. The channel was irregular in cross-section and exhibited a highly non-uniform velocity distribution (Hesse 1993). Currently, due to man's harnessing of the river, the historically dynamic river is very controlled. The river has been reduced in width and has been straightened to some degree through various actions over time. Meanders have been cut off, the flood plain has been constrained by levees, and the geometry of the channel is now more uniform in shape. From 1879 to 1972, the surface area of the river has been reduced by 50 percent, shortened in length by 45 miles, and the total area of sand islands declined by 97 percent (Galat et al. 1998). Its current condition (i.e. the lack of snags, sand bars, and side channels and shallow border area) has caused an increase in flow velocity, which today measures roughly 3 miles per hour at usual levels of river discharge (Schneiders 1999).

B. Water Quality

Current water quality in the Missouri River is generally considered to be good. Prior to dam construction, the Missouri River was a dynamic, free-flowing river. As such, continuous bank erosion was common, and the Missouri River naturally tended to be a turbid river. The average annual suspended sediment load in the historic river ranged from 125 million metric tons at Yankton, South Dakota to 318 million tons at Boonville, Missouri (Galat et al. 1994 citing others). Since then, the suspended sediment load has decreased by 69 to 99 percent depending on location and proximity to the mainstem dams. Many of the native fish species in the Missouri River, such as the pallid sturgeon, are specially adapted for life in turbid waters like those that were present in the historic river. Currently, as a result of the upstream reservoirs being constructed in the mid 20th century, turbidity is lower than the natural condition. Releases from Gavins Point Dam tend to be cooler than normal in temperature, free of sediment, low in nutrients, and saturated with dissolved oxygen. With increasing distance from Gavins Point dam, the water temperature, turbidity, and nutrients tend to increase due to tributary input.

Since the implementation of the Clean Water Act (CWA), over the last 30 years water quality has improved with regard to pollutant levels in the Missouri River. Primary sources of pollution in the river include runoff of fertilizer, pesticides, and herbicides from the predominantly agricultural watershed, as well as discharges from municipal wastewater

treatment facilities and other urban industrial operations. Below, a few reports are cited to highlight the main pollutants that are known to occur in the Missouri River; however, the reports do not suggest any major impairment to the river due to pollution.

It has been shown that increasing levels of these fertilizer, pesticides, herbicides, and nutrients tend to increase with increasing distance downstream from the Gavins Point Dam (USGS, 2002). Fish collections have been made in the Missouri River and have shown elevated levels of pollutants in tissue samples. For example, the Nebraska Department of Health issued consumption advisories in 2004 for the Missouri River from Omaha to Rulo due to polychlorinated biphenyls (industrial use), and dieldrin (agricultural pesticide) concentrations in fish (NGPC, 2004). While these pollutants now occur at very low levels in the river, they can tend to bioaccumulate in fish tissues. However, it is noted that a person eating 8 ounces of fish per week or less from this source is not considered subject to significant health risk.

Water quality management of the Missouri River is under the jurisdiction of the states. As required by the CWA, the Nebraska Department of Environmental Quality (NDEQ) and the Iowa Department of Natural Resources (IDNR) assessed and reported water quality data and information for the purpose of identifying the extent to which navigable waters support their designated uses, i.e., as a drinking water supply, for swimming and other recreation, fish and shellfish consumption, agriculture and as a habitat for wildlife. Both states have placed the Missouri River on the 303(d) list for water quality impairment mainly for reasons related to the beneficial use of “aquatic life support.” The 2002 303(d) list for Iowa (IDNR, 2002) states the reason for this is mainly due to lack of habitat attributable to river alterations due to channelization and flow modification. The Nebraska report (NDEQ, 2002) states a different interpretation, with fecal coliform from point and non-point sources and pH levels as the reasoning for their listing.

C. Noise

Sources of noise in the proposed project area result from agricultural activities, hunting activities, and occasional barges and motorboats on the Missouri River.

D. Wetlands and Riparian Vegetation

Approximately one-half of the wetland acreage in the reach of the project sites is emergent, dominated by reed canarygrass (*Phalaris arundinaceae*), common reed (*Phragmites australis*), sedges and rushes. Scrub-shrub wetlands are also abundant and are characterized by peachleaf willow (*Salix amygaloides*) and cottonwood (*Populus deltoids*), with some sandbar willow (*salix interior*). Most of the wetlands in this reach are associated with the old bends and oxbows that have been cut off from the river by bank stabilization structures or levees but are hydrologically maintained by groundwater seepage and surface inflows.

The wetland characteristics along the shoreline where the project footprint and fluvial effects will occur are similar. The deep-water wetland habitat of the Missouri River is the dominant wetland feature at all of the sites. According to the FWS's National Wetland

Inventory (NWI) maps, the predominant type of wetlands associated with the transitional areas (where river environment transitions to upland at the shoreline) include palustrine scrub shrub and palustrine forested wetlands. Typically, scrub shrub wetlands along this portion of the Missouri River are comprised of peachleaf willow and cottonwood, with some sandbar willow. The forested wetland areas are typically mature cottonwoods. Small patches of emergent wetlands do exist along the shore at some of the sites; however, they are much more commonly found in the landward portion of the flood plain. According to the NWI, Boyer, Langdon, and Tobacco Bends have 50 percent or more of the shoreline characterized as wetland, where the other sites are more characteristically upland row crop or upland forested areas.

Forested and row crop vegetation are the dominant features of the non-wetland flood plain areas. The forested areas mainly consist of an over-story of tall cottonwoods, but green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), mulberry (*Morus spp.*), elm (*Ulmus spp.*), and box elder (*Acer negundo*) are also common. These trees overhang the mid-story of shrubs that are comprised mainly of rough-leaf dogwood (*Cornus drummondii*). The under-story forms a ground cover of many plant species, including stinging nettle (*Urtica spp.*), scouring rush (*Equisetum spp.*), and poison ivy (*Toxicodendron radicans*). The cottonwood forests of the Missouri River are even-aged as a result of this species occupying recently accreted lands between dikes that were constructed 50 to 60 years ago. The cottonwood species typically reaches maturity in about 45 years and rapidly declines after 70 years (Harlow et al. 1979). The periodic flooding and fluvial activity needed for cottonwood regeneration has been prevented by river flows being managed by the upstream reservoir system and the stabilization of the river; thus, much of the forest structure is threatened. Vegetation that may be affected along the banks in areas not dominated by riparian timber includes native and non-native grasses and various shrubby species such as dogwood, sumac (*Rhus coriaria*), false indigo (*Amorpha fruticosa*), and poison ivy.

E. Fish

The Missouri River has historically been a turbid river, but the placement of dams has reduced the sediment load by dropping it in the reservoir basins. The lowered sediment load and turbidity in the modern river have made fish species that evolved in dark turbid environments more vulnerable to predation and competition from site-feeding predators. The historic flood plain habitat of the Missouri River also provided important habitat features and functions for riverine fishes. Cottonwoods, sycamores and other trees washed into the river during floods and collected in side channels, along inside bends or behind sandbars and islands. As the trees decomposed, they provided food and substrate for insects and other organisms, which are in turn consumed by fish. The presence of this material also created a complex habitat utilized by fish for cover as well. The main channel border areas and available side channels provided a diversity of depths and flows and probably served as nursery and feeding areas for many aquatic species of fish (Funk and Robinson 1974). Specifically, depth and flow diversity in the main channel border area are thought to be important habitat elements to endangered pallid sturgeon.

About 100 species regularly use the main channel or flood plain habitats downstream from Gavins Point Dam, and about 35 native species are thought to be declining; whereas some 23 species (including 9 introduced species) are thought to be increasing (Hesse 1996). Studies of the benthic fishes within the Missouri River were conducted between 1995 and 1999 (USACE, 2001). The study indicates the overall diversity of species in the unchannelized reaches is greatest, which reflects the greater number of microhabitats and available niches that are more reflective of a more natural river channel. The most commonly captured species in the project areas (channelized reach) include emerald shiners (*Notropis atherinoides*), red shiners (*Cyprinella lutrensis*), gizzard shad (*Dorosoma cepedianum*), and river carpsuckers (*Carpiodes spp.*). The study also shows that habitat used by the fish are generally skewed toward habitats associated with shallow depths and slower velocities. Species that utilized fast current were shovelnose sturgeon (*Scaphirhynchus platyrhynchus*), blue sucker (*Cycleptus elongatus*), sicklefin chub (*Macrhybopsis meekii*) and sturgeon chub (*Macrhybopsis gelida*), while walleye (*Stizostedion vitreum*) and sauger (*Stizostedion canadense*) utilized medium flow areas; bigmouth buffalo (*Ictiobus cyprinellus*), freshwater drum (*Aplodinotus grunniens*), and river carpsuckers used slow water habitat. Suitable nursery areas in the river are limited because of high velocity, turbulent flows, and silt and sand loads (USACE 1994). Freshwater drum, suckers (*Catistomidae*), minnows, and common carp (*Cyprinus carpio*) are the dominant larval species in the Missouri River. Spawning areas occur along the shoreline, in backwaters, and behind channel control structures. Over wintering habitats available to fish include deep scour areas with velocities that are relatively calm compared to the main channel, as well as the main channel itself during non-navigational winter discharges for main channel fish such as shovelnose sturgeon (Latka 1994). Scour areas are currently found behind dikes. In natural conditions, fish probably found backwaters with deep water and fall connectivity to the river to be suitable as winter refuge.

F. Wildlife

The Missouri River creates and maintains important forest and wetland habitat for a wide diversity of wildlife, including at least 60 species of mammals, 301 species of birds, and 52 species of reptiles and amphibians (Dunlap and Kruse, undated; Lynk and Harrell, undated; USFWS 1979). The most productive wildlife habitat in this channelized reach occurs in oxbow lakes and chutes that have been cut off from the river by the dikes, but still receive surface water or groundwater. Most of this type of habitat occurs in publicly owned lands such as state and wildlife management areas. Agriculture dominates most of the flood plain though, where a vast majority of the land has already been converted to cropland. The riverine habitats that still remain (have not yet been converted for other uses) are very important to supporting the wildlife that exists in the Missouri corridor. Wetlands in the flood plain can offer benefits to a variety of wildlife at different times of the year. During drying phases, shorebirds and water birds may concentrate on exposed mudflats and pools to feed on invertebrates. When wetland areas are dry, they afford excellent cover for ground nesting birds such as northern bobwhite quail (*Colinus virginianus*) and ring-necked pheasants (*Phasianus colchicus*). Terrestrial herbivores such as white-tailed deer (*Odocoileus virginianus*) will forage on wetland and moist soil plants and benefit from dense vegetation as cover or nursery areas.

Many species of reptiles and amphibians are found in riverine wetland and riparian areas. Some of the common species include the common snapping turtle (*Chelydra serpentina*), false map turtle (*Graptemys pseudographica*), smooth softshell turtle (*Trionyx muticus*) and several species of toads, frogs, and salamanders. Because reptiles and amphibians rely on wetland or riparian habitat features of the Missouri River and its tributaries, those habitats that remain within the river and flood plain are very important in supporting the populations.

Many mammals also are found within the Missouri River and its flood plain. Mink (*Mustela vison*), beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*) den near the shoreline, most typically in secondary channels or oxbows. The principal big game species found in the Missouri's flood plain are white-tailed deer, which occur along the entire river. Some other common mammals that inhabit the general project area include raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), cottontail rabbits (*Sylvilagus floridanus*), fox squirrels (*Sciurus niger*), red fox (*Vulpes vulpes*), and many small mammals.

Some of the common birds that can be found in the project areas include ring-necked pheasants, bobwhite quail, wild turkeys (*Meleagris gallopavo*), mourning doves (*Zenaidura macroura*), brown thrashers (*Toxostoma rufum*), robins (*Turdus migratorius*), eastern kingbirds (*Tyrannus tyrannus*), American goldfinches (*Carduelis tristis*), northern orioles (*Icterus galbula*), bluejays (*Cyanocitta cristata*), and cardinals (*Cardinalis cardinalis*). Shorebirds, waterbirds and wading birds that depend upon the Missouri's sandbars, islands and SWH – including great blue heron (*Ardea herodias*), killdeer (*Charadrius vociferous*), and gulls are also common. Large numbers of passerine birds, including the thrushes, warblers, wrens, sparrows and other small perching birds pass through the project area on their annual migrations. The Missouri River is part of the central flyway and serves as a major corridor for migrating birds. The Missouri's few remaining flood plain wetlands continue to provide temporary refuge for migratory waterfowl, and to a lesser degree, provide breeding habitat. Bald eagles and other birds of prey, including hawks, falcons, and owls also can be found along the Missouri within the riverside woodlands.

G. Cultural Resources

All of the proposed structure modifications will occur along the inside bends of the river. The inside bends or point bars of the river are the areas where accretion naturally occurs because the water velocities are lower in these areas. Moreover, all land adjacent to the river can be considered recent accretion and therefore will not contain prehistoric archaeological sites. The project sites will likely not contain structures eligible for, or listed on, the National Register of Historic Places (NRHP). This fact can be readily verified when viewing and comparing historic surveys of the river over the last 100 years. Additionally, this is supported by the fact that the soils on both sides of the river are classified as soil series formed in recent alluvium along the Missouri River. For this reason there are likely no historic sites because they would have to have been constructed on accreted land after the channelization project was completed. A site file search was completed at the Nebraska Historical Society on March 17, 2004 to locate any properties listed on or potentially eligible to the NRHP in Nebraska in the project areas. A site file search request was transmitted to the

Iowa State Archaeologist on March 16, 2004 for the site, Snyder Bend, Iowa. No sites are reported within the project areas in either Nebraska or Iowa. These findings were coordinated with the Nebraska and Iowa State Historic Preservation Officers.

H. Navigation

The BSNP from Kansas City, Missouri, to Sioux City, Iowa was first authorized by the 1927 Rivers and Harbors Act (RHA), which extended the original authorized project (1912 RHA) from approximately 360 miles to 730 miles in length. The project provides for a 9-foot channel of adequate width via a system of revetments placed along the outside of bends and transverse dikes placed along the inside of bends and flows are supplemented through releases from the up-stream reservoir system. The Corps is required by law to maintain the navigation channel in the Missouri River from Sioux City, Iowa to the mouth at St. Louis, Missouri. Because the river is maintained as a navigation channel, the U.S. Coast Guard maintains and distributes channel markers and aids to navigation on the river to facilitate safe navigation and prevent accidents.

ENVIRONMENTAL CONSEQUENCES

A. Fluvial Characteristics

The proposed project will not promote the flooding processes that are natural to the Missouri River ecosystem; however, allochthonous input, or the input of outside organic material, is anticipated to increase due to the increase in localized erosion that is expected to occur. Also, the river would claim the vegetative material that is grubbed and stockpiled on site during the construction process during high water. This input, while not a significant source of carbon to the river in light of the total input of the system, would provide a carbon based aquatic food source on a local basis. Snags would form from the introduction of trees eroded from the bankline, providing increased habitat diversity on a local basis as well. While changes to the thalweg are not anticipated, greater top-width and irregularity in cross-sectional velocities in the main channel border are expected. Overall, the project sites are anticipated to become shallower in nature, with a greater diversity in depths and velocities resultant of the modifications that are proposed. Approximately 10 acres of additional SWH are projected for each river mile of project area based on findings from Remus and Davinroy (2001).

B. Water Quality

Historically, the Missouri River carried a high sediment and nutrient load from over bank flooding and tributary input. As a result of the proposed project, small amounts of sediment may be stirred up during placement of the rock for the chevron structures. This would produce localized small increases in turbidity that would last only as long as it takes to construct the structures. Once the dike modifications and chevron construction are complete, the riverbank would begin to erode into the river over a long-term period. This would add sediment to the river, and may slightly increase turbidity locally. However, the added increment of sediment would be so insignificant that it would be nearly undetectable.

Therefore, there would be no adverse impacts to the current water quality in the river as a result of the proposed project. Added introduction of pollutants are also not expected as a result of this project. The contractors responsible for the construction of the projects will be required to have contingency plans in the unlikely case of a fuel or oil spill.

C. Noise

Minor and temporary increases in noise would be experienced during the construction phase of the project. Long-term sources of noise in the area would not be affected. The major sources of noise would still result from agricultural activities, hunting activities, and occasional barges and motorboats on the Missouri River.

D. Wetlands and Riparian Vegetation

Because this project is designed to encourage erosion of the high bank and development of SWH, the net result of the proposed action will likely increase the wetland characteristics at the sites. Some palustrine wetlands may develop in the shallow areas that are created. More than likely though, upland, forested wetlands, and scrub shrub wetlands that are currently adjacent to the river will convert to shallow water riverine wetlands. Wetlands that reside within the landward portion of the flood plain will not be impacted.

The proposed project is intended to encourage erosion of the banks between the dikes for a distance of approximately 125 feet back from the end of the dike. This would cause trees and any other vegetation within this zone on the banks to erode into the river. The erosion process being allowed to occur at these sites is not problematic, as the lands adjacent to the areas where the proposed work would take place are owned either by the Corps, the FWS, or by the corresponding state fish and wildlife agencies. Because timber is abundant, the proposed project would not adversely affect forested areas by removing trees through construction or erosion. In fact, the even aged stands of cottonwoods along the river are not a natural feature. Historically, stands of timber were renewed from time to time via erosion and re-establishment. This action could allow pioneer cottonwood and willow stands to develop along the action area through the erosional and depositional processes. For this same reason, snags would be more numerous in the action area, would increase roughness of the main channel border area, and help create a more complex habitat.

E. Fish

While it is certain that habitat shapes the fish communities that make up the Missouri River, it should be mentioned that little is known about exactly what factors actually control fish production in this reach of the river. It is anticipated that many of the benefits attributable to the proposed project are because it will provide a more natural diversity of habitats that are not found in the main channel and main channel border area, which in turn provides increased potential for production, rearing, and refuge for invertebrates and fish. The larval stage is a bottleneck in a fish's life cycle. The river's sandbars and the slow-

moving, shallow water associated with it have historically provided larval fish with the habitat necessary for survival. By providing more of this currently lacking habitat, this project should benefit many species of fish. The trees that erode into the river would add carbon to the river and provide areas of complex habitat, provide substrate for invertebrates, shelter from current, and hiding places for forage fish. It has been shown at the Boyer Bend project that as shallow water habitat is expected to result, it will be at the expense of existing deeper water (5 to 10-foot depths) (Remus and Davinroy 2001). A reduction in the maximum depths of the area will result in the loss of some of the suitable fish over wintering habitat (water greater than 7 feet sheltered from flow). Because the predominant feature of the Missouri River is habitat associated with dike fields, including deep scour holes, refuge from harsh winter conditions can be readily found in the river. Deep water is also anticipated directly behind the chevrons preceding the resultant sand bars. For these reasons, the net impact to fishery is considered a positive one.

For detailed information on benefits of the project to pallid sturgeon, please refer to the Federally Threatened and Endangered Species section of the EA below.

F. Wildlife

Wildlife species, while important components of the Missouri River, are not anticipated to show significant gains or losses if the proposed action is implemented and will not be significantly affected by the project. Some animals may be disturbed or displaced during the time of construction; however, this would be a temporary and minor impact. Because the project is proposed to be constructed during the late spring and early summer months, the reproductive portion of the season, direct impacts could occur to species in the vicinity of the project, most specifically to birds that have established nest sites at the project areas. Because the size of the sites are relatively small portions of the total length of the Missouri River and each dike (individual construction footprint) within the site is an even smaller component of the site, minor and short-term impacts are expected to occur to nesting birds. Because of the mobility of other terrestrial organisms, impacts are expected to be even less significant. As aquatic projects such as this one are constructed in the future, benefits to wildlife could be assumed to increase, as increasing diversity of the river and transitional zone would result in a more natural environment in which species have evolved. As shallow water increases on the river as a result of this project and other projects that increase shallow water, wading birds (e.g., herons) and birds that visually feed in flight (e.g., gulls, terns) will be provided improved foraging opportunities on the Missouri River.

G. Cultural Resources

Most of the proposed work would take place from a barge. However, in some locations, the equipment may have to crawl off the barge up onto the bank to complete the work. Excavation would only occur within the footprint of the existing dikes. The material that would be removed would consist of the materials that make up the dikes (rock and pilings), along with some soil that would have accreted around the edges of the structures sometime after they were constructed. The dikes would be lowered to a maximum depth of 5 feet below CRP. The only material that would be excavated is the rock and pilings used to

construct the dikes. There would be no excavations to depths that would reach below the bottom of the structures into native soil. All of the proposed structural modifications would occur along the inside bends of the river. The inside bends or point bars of the river are the areas where accretion naturally occurs because the water velocities are lower in these areas. The majority of the land between the dikes along the channelized Missouri River, and especially along the inside bends, is recently accreted sediment that was deposited as a result of the BSNP. For this reason there are no structures eligible for, or listed on, the NRHP that would be affected. Construction of the chevron structures would simply involve the placement of rock on the river bottom; therefore, no cultural resources would be adversely impacted. No structures listed on the NRHP exist in the areas where the work would be performed. For these reasons, there is no potential to adversely impact cultural resources as a result of the proposed project.

H. Navigation

The proposed project is designed to provide SWH along the main channel border without adversely impacting the 9-foot by 300-foot navigation channel. The effects of the proposed construction would be monitored; and, in the unlikely event the navigation channel is impacted, adjustments would be made to eliminate the problems. Therefore, the proposed project is not likely to adversely impact the navigation channel.

The ends of dikes that protrude far out into the river would be left intact as markers to pleasure boaters. The chevron structures and the shorter modified dikes may be difficult to see and could present a hazard to pleasure boaters. In order to minimize the potential hazard to boaters, boater education information would be distributed, and warning devices would be placed within the 13-mile area where the chevron construction and dike modifications would take place. For these reasons, the increased safety risk to pleasure boaters would be minimal.

FEDERALLY THREATENED AND ENDANGERED SPECIES

The FWS has already considered the biological effects of the construction of shallow water in the development of the RPA for the BiOp and determined that it is an integral component to avoid jeopardy to listed species. Therefore, the Corps is not required to prepare a Biological Assessment (BA) for this action (FWS letter, February 20, 2002). However, for the purposes of NEPA, this EA discloses the effects/benefits of the project on endangered species.

SPECIES	STATUS	HABITAT
Pallid sturgeon <i>Scaphirhynchus albus</i>	Endangered	Missouri River

POSITIVE EFFECT –

The pallid sturgeon was listed as an endangered species on September 6, 1990. It inhabits the Missouri River and the Mississippi River below the mouth of the Missouri. Little is known of the basic biology, life history and habitat utilization of this species.

Pallid sturgeon abundance has declined throughout the Missouri River since construction of the BSNP (Carlson et al. 1985). Over fishing, pollution, and hybridization that has occurred due to habitat alterations have also contributed to the population decline of the species (FWS 1993). Destruction and alteration of habitats by human modification of the river system is believed to be the primary cause of decline in reproduction, growth, and survival of pallid sturgeon. Recovery of the species is unlikely if habitat elements of the Missouri and Mississippi River are not restored (USFWS 1993). The FWS has stated its support for this project because aggressive implementation of RPA element VII.1.b. and acceleration of SWH development both address an immediate need for survival and recovery of the pallid sturgeon (March 5, 2004 letter correspondence from Robyn Thorson (FWS) to Gen. Grisoli (Corps)). The current acreage of SWH from Sioux City to the mouth is 2 to 5 percent of the historic acreage (FWS 2000). This project proposes to restore shallow water and depth diversity in the main channel border area, thus helping to restore a portion of the natural habitat elements of the river, which are thought to benefit pallid sturgeon. The species is well adapted to turbid waters and would not be impacted by the short-term construction related activities.

Very little is known about the current status of the pallid sturgeon in the Missouri River below Gavins Point Dam (USFWS 2000). Capture/recapture data is infrequent. Hatchery-raised juvenile pallid sturgeon have been stocked below Gavins Point Dam and in the lower Platte River during the 1990's. Rough estimates of 1 to 5 pallid sturgeon per kilometer in the channelized river have been made to provide a total estimate of between 1,303 and 6,516 in this river section (Duffy et al 1996). In a study being conducted in the lower 200 miles of the Missouri River, it was noted that the ratio of pallid sturgeon to river sturgeon has decreased from 1:311 in 1996-2000 to 1:387 in 2002.

In the Middle Mississippi River, pallid sturgeon have been shown to prefer main channel border, downstream island tips, areas between wing dams, and scour areas off of wing-dam tips (Sheehan et. al. 2000). On the Platte River, observations of hatchery reared pallid sturgeon usually occurred in areas downstream of sandbars where currents converge (Snook and Peters 2000) and adult pallid have been observed on the Missouri River to utilize high to low velocity breaks (Mestl, NGPC; JoAnne Grady, USFWS FRO, Columbia, MO, personal communication). This project, by encouraging the formation of sandbars and secondary channels (around the chevron structures) will be creating island tip/channel convergence type habitat where it does not currently exist.

The range of water depths shown to be used by pallid sturgeon varies across studies. Dave Herzog of Missouri Department of Conservation (personal communication) mentioned that a series of studies being completed on the Mississippi River show that 21 feet (Southern Illinois University - Carbondale studies), 20 feet (Corps' Engineer Research and Development

Center studies), and 12.5 feet for their own studies were the mean depth of all captured pallid sturgeon. Pallids have been captured on the Missouri River at depths as shallow as 3 feet (Mestl, Nebraska Game and Parks, personal communication), and in the relatively shallow Platte River, Snook and Peters (2000) found that 88 percent of observations occurred in depths of 1 to 3 feet. While "shallow water" has been shown to be used by adult pallid, it may not necessarily provide the habitat preferred by adult pallid sturgeon. However, this project will provide habitat needed to support components of the ecosystem that are thought to be very important to pallid. For example, the primary food eaten by the pallid sturgeon includes mostly aquatic invertebrates (principally early life stages of insects) but also some fish (FWS 1993). It is anticipated that the increased amount of trees that are expected to be eroded into the river and the increased diversity of depth and flow from the project will increase, thus improving the invertebrate production of the sites. The SWH should also provide food and refuge for small minnow species that pallid utilize as food. The area is also thought to provide the opportunity for free swimming and drifting fish larvae and juvenile fish to find areas of refuge (including larval pallid), and areas where organic materials accumulate and provide forage, making the area suitable as nursery and rearing habitat which should help in recruiting these fish into later stages of their development.

This project is anticipated to improve habitat found within the Missouri River for pallid sturgeon, and this action, along with other similar activities currently being planned to create SWH, is expected to produce a beneficially cumulative impact.

Bald eagle

Haliaeetus leucocephalus Threatened Breeding and roosting near water bodies

NO EFFECT –

The bald eagle was listed as an endangered species in 1978 following a dramatic drop in population that began at the turn of the century. Its status was upgraded to "Threatened" August 11, 1995. It was petitioned for delisting on July 6, 1999 (64 FR 36454).

Bald eagles are common migrants and winter residents in the project area and are rare breeders along the river. As such, majority of bald eagle sightings within the project area occur during the fall and winter. Bald eagles that use the large cottonwoods trees as feeding perches during the fall and winter are common. On the Missouri River, wintering birds typically occur between November and March. Wintering bald eagles require night roosts located in sheltered timber stands near an abundant food source such as fish, waterfowl, or carrion (Stalmaster 1987). Winter use is highest where the river is ice-free and adequate perch sites are available. Because the construction of this project will be limited to the spring and early summer, impacts to winter roost sites or perching sites are not expected.

Nesting usually occurs in large trees with specific size and structure characteristics, and generally occurs in the same territories in subsequent years (Stalmaster 1987). Nesting sites are also selected based on relative distances to shorelines of lakes or rivers and usually away from human disturbance. Eagles are known to nest along the Missouri River, but none are noted to be nesting within the proposed project areas. If any bald eagles are found to be

nesting in the proximity of the proposed project sites, a buffer zone of 1/2 mile would be followed, restricting construction access to areas within specified distance of nesting areas. Again, because no significant terrestrial disturbances are expected, direct impacts to summer nesting, roosting, or perch trees are not expected.

This project is not anticipated to have site-specific impacts on bald eagle habitat or individually or cumulatively have an adverse impact on their population.

Interior Least tern

<i>Sterna antillarum</i>	Endangered	Bare, alluvial and dredge spoil Islands
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Piping Plover

<i>Charadrius melodus</i>	Threatened	Bare, alluvial and dredge spoil Islands, sand pit shorelines
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POSITIVE EFFECT –

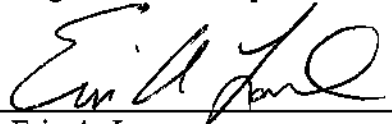
The interior least tern was listed as endangered in 1985. The severe decline in interior least tern populations is largely attributable to river channelization, irrigation diversion, and damming along the species prime nesting ground. The piping plover was listed as threatened in 1995 as well. Piping plovers are anticipated to be affected in much the same way as least terns because both species utilize similar habitat within the river. These species both prefer nesting habitat that consists of riverine sand and gravel bars that are sparsely vegetated and within a wide unobstructed river channel. These birds regularly use the Missouri River for feeding and reproduction; however, no least tern or piping plover nesting has been recorded along the portion of the Lower Missouri River from Ponca to the mouth of the Missouri River in recent times because of the lack of available sandbar habitat. Because no usable sandbars are found in the project areas, there should be no negative impacts on breeding least tern pairs or colonies. The project, once completed, may provide sandbars that could provide available nesting habitat in the future. However, the design of the project is based on providing SWH as opposed to providing exposed sandbars.

CUMULATIVE EFFECTS


As described in the 2003 BiOp amendment, the implementation of this project, in conjunction with other ongoing and proposed SWH construction between Gavins Point Dam and the Osage River, is expected to have a cumulative positive effect on Missouri River habitat. Each of the sites differs in the exact type of work planned and the resulting habitat, but ultimately the biological benefits to Missouri River biota, particularly in regard to the pallid sturgeon, will have beneficial value. While providing positive biological benefits, the design of all the SWH projects is intended to maintain the integrity of the navigation channel by preventing thalweg meander, so negative cumulative impacts to navigation is not anticipated. The total capacity of the channel will also not be negatively altered. There will be an even amount of placement of stone in the river to removal of stone from the river, so no net fill will be added to the river. The shape of the channel cross section will change somewhat due to the projects being implemented, but the total capacity (area) of the channel will not be altered; thus, there will be no impacts to flooding.

MONITORING AND EVALUATION

In order to assess the effectiveness of the proposed project in producing the targeted shallow, slow water habitat, the monitoring and evaluation programs under the BiOp as well as the Missouri River Mitigation program will be able to provide insight into the benefits provided by the proposed project. The details of these monitoring plans are not final and are being developed in coordination with the FWS, U.S. Geological Survey/Biological Resources Division, Kansas City District U.S. Army Corps of Engineers, and research biologists. Under these monitoring programs, biological outputs of the project would be evaluated. Also, site specific physical monitoring of select portions of this and other shallow water projects is planned in order to measure success of meeting the total SWH acreage and to specify, in more detail, the changes that occur over time to the sites (Appendix E). These monitoring schemes would be accomplished in order to apply the concept of adaptive management, so that any deficiencies in the design could be modified in order to produce the highest possible output. Monitoring and evaluation is important in furthering our understanding of the true benefits of projects such as this and other SWH projects being concurrently planned. The results of this "learning-by-doing" feedback loop are essential in planning successful projects in the future.

Prepared by: 
Eric A. Laux
Environmental Resource Specialist

Date: 4/08/04

Approved by: 
Candace M. Gorton
Chief, Environmental, Economics, and
Cultural Resources Section

Date: 4/9/04

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APPENDIX A

OFFICIAL 2004 CORRESPONDENCE BETWEEN SERVICE AND CORPS RELATED TO IMPLEMENTATION OF THE BIOLOGICAL OPINION



DEPARTMENT OF THE ARMY
NORTHWESTERN DIVISION, CORPS OF ENGINEERS
P.O. BOX 2870
PORTLAND, OREGON 97208-2870

Reply to
Attention of:

Planning and Policy Division

13 FEB '04

Ms. Robyn Thorson
Regional Director, Great Lakes-Big Rivers Region
U.S. Fish and Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive, Room 630
Fort Snelling, Minnesota 55111-4056

Dear Ms. ~~Thorson~~ ^{Robyn}:

This letter is a follow-up to discussions between our two agencies on January 26, 2004, in Omaha, Nebraska, regarding your 2003 Amendment to the 2000 Biological Opinion (BiOp) on the operation of the Missouri River Mainstem Reservoir System (Mainstem System), the operation and maintenance of the Missouri River Bank Stabilization and Navigation Project, and the operation of the Kansas River Reservoir System (2003 Amended BiOp). In that meeting, we discussed the Corps' plan for the creation of habitat for the threatened and endangered species along the Missouri River and selected tributaries, and the Corps' plan for the operation of the Mainstem System this summer. This letter documents the issues discussed at that meeting and further developed in subsequent discussions between the Corps and the Service.

Your 2003 Amended BiOp indicates that when 1200 acres of new shallow water habitat have been made available in the Sioux City to Omaha reach that the agencies may consult to modify flows to take advantage of that habitat and more fully meet Corps project purposes. We believe that current scientific information shows that expanding the development of these 1,200 acres of habitat beyond this reach to the entire reach of the Missouri River to be biologically warranted. We also believe that it may be biologically warranted to take actions along some of the major tributaries of the Missouri River where the pallid sturgeon is known to exist. The enclosed document presents in detail the basis for these conclusions and other issues discussed at our January 26 meeting in detail and includes references to the relevant scientific documentation.


We understand from our January 26 meeting and subsequent discussions that the Service concurs with the approach set forth in this letter and its attachment. Please confirm your concurrence with our plan for pallid sturgeon habitat development as set forth in the enclosed attachment and the Corps' flexibility to operate the system in 2004 to meet all congressionally authorized purposes.

The Corps is also pursuing implementation of the various habitat and propagation requirements and other components of the 2003 Amended BiOp in addition to the shallow water habitat creation discussed above. We are seeking authority to reprogram 2004 appropriations to

construct habitat as provided for in the 2003 Amended BiOp. Both of our agencies' staffs have worked together for many years for the improvement of the health of the Missouri River ecosystem. It is timely and appropriate for our agencies to intensify and further coordinate our efforts to ensure the survival and recovery of the interior least tern, piping plover, and pallid sturgeon.

I want to take this opportunity to express my sincere appreciation for your efforts, and that of the other U.S. Fish and Wildlife staff involved, in the preparation of the 2003 Amended BiOp. I look forward to your response to this letter. Should you or your staff have any questions or need any additional information, please do not hesitate to contact me, or Mr. David Ponganis of my staff.

Sincerely,

A handwritten signature in black ink, appearing to read 'William T. Grisoli', with a stylized, cursive script.

William T. Grisoli
Brigadier General, U.S. Army
Division Engineer

Enclosure

**ATTACHMENT
BIOLOGICAL AND ENGINEERING INFORMATION
2003 AMENDMENT TO THE MISSOURI RIVER 2000 BIOLOGICAL OPINION**

This attachment provides biological and engineering information on the Corps' implementation of the summer habitat flows and pallid sturgeon habitat provisions of the Service's 2003 Amendment BiOp Reasonable and Prudent Alternative (RPA). It also documents other elements of the RPA that the Corps and the Service discussed at the January 26, 2004 meeting in Omaha, Nebraska.

The 2003 Amended BiOp RPA VII.1.b indicates that when 1200 acres of new shallow water habitat have been made available in the Sioux City to Omaha reach that the agencies may consult to modify flows to take advantage of that habitat and more fully meet Corps project purposes. In reviewing recent biological studies of the drifting phase of pallid sturgeon and population assessment sampling in the Missouri River (Platte River to the Kansas River), and sampling within the Platte River itself, the Corps believes that the biological needs of the pallid sturgeon are better met by not only providing habitat in the Sioux City to Omaha reach, but also providing habitat throughout the system.

Biological Benefits of Shallow Water Habitat from Sioux City to the Mouth

Studies focusing on the behavior and migration patterns of the early life stages of sturgeons (pallid and shovelnose) have been conducted as recently as 2003 and have resulted in new information on larval drift.

Immediately following hatching, pallid and shovelnose sturgeon experience a naturally occurring drifting phase. Kynard, Henyey and Horgan (Kynard) utilized both pallid and shovelnose sturgeon during laboratory testing to further understand and quantify the various behaviors during this critical life stage. Laboratory efforts conducted by Kynard indicated that pallid sturgeon fry may drift for up to 13 days post-hatch. Other than a few exceptions, the migration style of pallid and shovelnose sturgeon were similar regarding rate of drift and duration of drift. The pallid fry drifted approximately twice as long as the shovelnose, but at half the rate. Pallids were most active during the day, whereas the shovelnose were most active at night. Strong similarities between the species include the location in the water column used at a given age for each species. Prior to the age of day 7, both species utilized the lower portion of the water column and from the age of day 7 to completion of the drifting phase both species utilized the upper portions of the water column.

In July 2003, a field larval drift experiment was conducted in a secondary channel of the Missouri River in Recovery Priority Management Area #2 (near Culbertson, Montana). Due to the inability to differentiate unmarked pallid sturgeon fry (that would not be recaptured during this experiment) with any potentially naturally reproduced pallid sturgeon, Braaten, Fuller and Brandt (Braaten) utilized shovelnose sturgeon fry to conduct the field drift test. Shovelnose sturgeon fry ranging from 0-2 days of age were

utilized on two separate trials within the study area. During each trial, all of the fry were released at point "0" at the head end of a secondary channel with collection locations located at four evenly dispersed sampling sites downstream (0m/Release Site, 100m, 500m, 900m, 1300m). At each site, nets were fished in tandem (top and bottom) and pulled and replaced at 30 second sampling intervals resulting in continuous sampling throughout each trial.

The laboratory studies by Kynard were well supported by the larval field drift study in relation to water column use. Eighty-seven percent of the age 0-2 fry were sampled near the river bottom and there was an increase in use of the lower portion of the water column as the fry moved downstream at each transect. Basic velocity information in river systems yields the slowest velocities near the river's bottom and the swifter velocities near the surface. As a result, the fry drifted at a rate slower than the mean column velocity but similar to the velocity data collected near the bottom of the water column. As previously mentioned, both species tend to utilize the upper portions of the water column after day 7. The drift duration of the pallid sturgeon is approximately twice that of the shovelnose; therefore, there is an increased potential for the pallid sturgeon to drift much greater distances than the shovelnose sturgeon. This statement is supported by the laboratory findings that both species tend to utilize the swifter upper portion of the water column after an age of 7 days.

To estimate larval drift rates based on conservative velocities that may be found in the Missouri River a standard figure of 0.35 m/s (bottom velocity) may be used to approximate drift distance for larvae prior to an age of 7 days. The same philosophy holds true for larvae 7 days and older by using a conservative 0.75 m/s (surface velocity). This assumption is based on Kynard's laboratory studies that these fry utilize these portions of the water column at these given ages. If pallid sturgeon spawned at the base of Gavins Point Dam (which is highly unlikely) and the hatched fry drifted for 8 days, they may travel approximately 310 Km (193 miles). Also utilizing this conservative drift rate with a total drift duration time of 13 days as supported by Kynard's laboratory studies, the fry may drift approximately 633 Km (393 miles). At the minimum drift duration, fry may complete the drifting phase at approximately the Platte River; however, the potential for these fry to drift downstream of Omaha is highly probable even based on these conservative drift rates. Additionally, Kynard references the typical behavior of sturgeon species to migrate downstream in two phases. The first phase being the drifting of the fry and the second phase is an actual downstream swimming migration once these fish become pelagic.

Kynard expanded his laboratory research efforts in 2003 to evaluate behavior of pallid sturgeon fry in relation to depth (water column height). Kynard found that the fry would swim to the water's surface in a 10 foot tube from day 6 through day 9. This current information will significantly increase larval drift rates and distances over the projections used above (Personal Communication, Dr. Boyd Kynard, USGS, January 2004).

In addition to the information related to the larval drift characteristics of the pallid sturgeon, the Nebraska Game and Parks Commission's population assessment sampling

in the Missouri River (Platte River to the Kansas River), and the University of Nebraska's sampling within the Platte River itself provides data to support the significance of the Platte River regarding use by pallid sturgeon. If pallid sturgeon are spawning in or near the Platte, the same drift distances as described above would indicate that the benefits of shallow water habitat creation would be most appropriate further downstream to provide the greatest opportunity for naturally reproduced larval pallid sturgeon to drift to during this critical life stage. Shallow water habitat above the Platte River may provide multiple benefits to the river, but would likely provide little benefit to pallid sturgeon regarding their critical drifting phase in the near term.

Natural reproduction has been documented by the Columbia Fishery Resources Office (USFWS) on a couple of occasions in the late 1990's. University of Missouri (Columbia) has also captured and documented naturally reproduced young-of-the-year pallid sturgeon as recently as 2002. Although it is impossible to determine where these fish drifted from, it is highly probable that spawning may be occurring in association with the Platte River.

Although the wild populations of pallid sturgeon are severely depressed, the propagation/population augmentation efforts are intended to replace year classes due to the lack of natural reproduction and recruitment. Currently, standardized stocking sites on the Missouri include Mulberry Bend near Vermillion, South Dakota, Bellevue, Nebraska, and Booneville, Missouri. None of these stocking sites fall within the Sioux City to Omaha reach (although the Bellevue site is in close proximity to this reach). An additional basis for the creation of shallow water habitat further downstream from Omaha is that the habitat should be within the reaches that are being stocked to maximize the opportunity for these juvenile fish to survive and recruit into the population.

Increasing the habitat diversity of the Missouri River to provide the habitat elements for the species to recover hinges on the creation of shallow water habitat. Although in the long-term, shallow water habitat is essential throughout the Missouri River system, the immediate need for this component extends to the lower portion of the river.

There would be tremendous biological benefits to pallid sturgeon and other native fish species by emphasizing the creation of functional shallow water habitat from the Platte River to the mouth of the Missouri River.

Biological benefits associated with the creation of shallow water habitat in the lower Missouri River in addition to the Sioux City to Omaha reach include:

- Maximizing the opportunity for survival and recruitment during this critical life stage by providing shallow water habitats in reaches that larval sturgeon are known to inhabit (based on previous collections).
- Enhancement of invertebrate production in these shallow water habitat areas critical to the survival of early life stages of pallid sturgeon and other native species

- Increasing the abundance of other native fish species (e.g., sicklefin chub, sturgeon chub).
- Increasing the forage species (native fish species) that are believed to be a critical component to pallid sturgeon diet as they transition from an invertebrate feeder to piscivory.

Shallow Water Habitat

Since the issuance of the 2000 Biological Opinion, the Corps has been pursuing creation of shallow water habitat (SWH). The 2000 Biological Opinion did not prioritize river reaches for habitat creation. Therefore, projects were developed throughout the entire reach from Sioux City to the mouth of the Osage River where existing public lands were available and construction could be completed as quickly as possible, and where the Corps' studies estimated a loss in shallow water habitat of 1,200 acres of habitat due to flow management. Prior to the completion of the 2003 Biological Assessment, approximately 1,147 acres of shallow water habitat were developed on the Missouri River in the reach between the Platte River and Osage River. Table 9 of the Amended BiOp estimates available shallow water habitat under the current water control plan. This was the same information used in the 200 Biological Opinion. The 1,147 acres developed since 2000 are not included in Table 9 utilized in the Amended Opinion.

Another 1,045 acres are either already in place or scheduled to be completed by July 2004 with 865 of those acres located in the Sioux City to Omaha reach. The amount of new habitat either currently available, or planned to be available by July 2004, totals 2,192 acres. Table 1 identifies the location and amount of estimated shallow water habitat to be available by July 2004 and July 2005. The Corps is now prioritizing future construction in the Sioux City to Omaha reach.

Table 1. ESTIMATED SHALLOW WATER HABITAT (SWH)			
Site	New Acres created by November 2003	New Acres of SWH Online by July 2004	New Acres of SWH Online by July 2005
Missouri River (Sioux City to Omaha)			
Tieville-Middle Decatur Bend	0	465	0
Desoto Bend Lake	0	400	0
Kensler Bend	0	0	50
Glovers Point Bend	0	0	40
Hole-in-the-Rock	0	0	7
Blackbird Bend	0	0	95
Soldier Bend	0	0	20
California Bend	0	0	18
Desoto Bend Dikes	0	0	30
Boyer Bend	0	0	60
Plattsmouth Bend	0	0	40
Subtotal/year	0	865	360
Cumulative	0	865	1225

Missouri River (Platte River to the Mouth)			
Tobacco Bend	55	0	See Note
Upper Hamburg Bend	55	35	See Note
Lower Hamburg bend	0	55	See Note
Kansas Bend	0	0	See Note
Langdon Bend	15	0	See Note
NWK Dike Mods	400	0	See Note
Monkey Mountain	12	0	See Note
Worthwine Island	40	0	See Note
Benedictine Bottoms	20	0	See Note
Fort Leavenworth	20	0	See Note
Weston Bend State Park	10	0	See Note
Kansas City Reach	40	0	See Note
Lisbon - Jameson Island	200	0	See Note
Franklin Island	10	30	See Note
Diana Bend	20	30	See Note
Marion Bottoms	250	30	See Note
Subtotal/year	1147	180	See Note
Cumulative	1147	1347	1347
Missouri River (Sioux City to Mouth)			
Cumulative New Acres	1147	2192	2552

Note: Plans for additional SWH are under development at these sites and others along the BSNP.

Each site differs in the type of work planned, the resulting habitat, and ultimately the biological output, especially for pallid sturgeon. The following paragraphs describe the categories of work that would create shallow water habitat.

- **Inside Bend Habitat.** These projects consist of modifying existing structures and/or building new structures that will result in diversification of existing aquatic habitat and/or increase the topwidth of the river. In general, projects along public property will both diversify existing habitat and increase the river's topwidth, while projects along private property will only diversify existing habitat. Structure modifications to increase diversity will result in greater depth and velocity distribution within a specific area, however will not necessarily result in additional shallow water habitat. Conversely, structure modifications to increase the river's topwidth will increase the total amount of aquatic habitat available. Most projects with structure modifications increasing the topwidth will diversify the existing and new habitat, resulting in increased amounts of SWH.
- **Outside Bend Habitat.** Projects and resulting habitat will be similar to inside bend projects except it is likely that the habitat resulting from outside bend projects will have an average depth greater than inside bend projects and will have slightly less

velocity and depth diversity. In addition outside bend projects will likely have higher average velocities during above average and higher stages.

- **Off Channel Chutes.** Projects consist of excavating long, fairly narrow channels through the overbank. These projects will result in increased amounts of diverse aquatic habitat defined as SWH. When first constructed, most chutes will be of rather uniform depth and velocity with a mean average depth of between 2' and 6' during normal navigation stages. The chutes will widen and diversify over time as they mature. The end product will increase total available aquatic habitat and SWH acreage.
- **Off Channel Backwaters.** The work consists of excavating/dredging backwaters in areas that have historically been connected to the river. These projects will reconnect the backwaters to the river, most at the downstream end. Depths generally range from 2-6 feet below the water surface at normal navigation stages. Some areas are designed with deep holes (7-12 feet deep) at intermittent locations in the backwater. The side/beach slopes along the perimeter of the backwaters are vary between 1:2 to 1:10.

The individual projects at each site may contain one or more of the above actions, which would result in different types of habitat. A standardized hierarchical habitat classification system has been developed by a team of Missouri River biologists and scientists to classify the habitats of the riverine segments of the Missouri River from Fort Peck Dam to the mouth near St. Louis. Macrohabitats are broad categories describing the various habitats throughout the river system. All of the shallow water habitat projects fall into four of these macrohabitat types.

- **Main Channel Inside Bend:** The inside bend is the convex side of a river bend.
- **Main Channel Outside Bend:** The outside bend of the river is the concave side of a river bend.
- **Secondary Channel-Connected:** Secondary connected channels are open on both ends and have flowing water but carry less flow than the main channel.
- **Secondary Channel-Non Connected:** Secondary channel non-connected are channels that are blocked at one end.

The diversity of the macrohabitats can be further defined by additional descriptors, mesohabitats. It should be noted that the secondary channel-non-connected are not further broken down into mesohabitats because of the lack of additional diversified habitat features (e.g. flow velocities). This is consistent with the Pallid Sturgeon Population Assessment Protocols. The following describe the different features of these mesohabitats.

- **Bars:** Sand bar/shallow bankline mesohabitats are the terrestrial/aquatic interface area of deposited sediment where water depth is < 1.2 meters.
- **Pools:** Pool mesohabitats are areas immediately downstream from sandbars, dikes, snag-piles or other obstructions that have formed a scour hole > 1.2 meters.
- **Channel border:** The channel border mesohabitat lies along a bankline or a sandbar area between the thalweg and the 1.2 m depth interval in the channelized river.
- **Thalweg:** The deepest part of the main channel between the channel borders conveying the majority of the flow . Thalweg does not apply to the inside bend macrohabitat.
- **Island Tip:** The island tip is the area immediately downstream of a sand bar or island where two channels converge and water depth is > 1.2 meters. Only found in conjunction with secondary channel-connected macrohabitat.

Biological Benefits

The biological benefits associated with the four macrohabitat types described above of shallow water habitat are discussed below.

1. Main Channel Inside Bends: Inside bend modifications provide an increase in the mesohabitats as described above. The widening of the top-width via dike-notching and associated activities increases the erosion along the inside bend shoreline providing:

- Increased habitat available for native chub species believed to be critical to the pallid sturgeon's foraging requirements as they convert from invertebrate feeders to piscivory
 - In 2002, 90% of all of the *Macrohybopsis* species sampled by the Nebraska Game and Parks Commission were collected in the inside bend (Steffensen, 2003).
- access for larval pallid sturgeon and other native species to passively drift into these areas and utilize diverse mesohabitats critical for survival and recruitment
- an increase in the organic matter that enters the river which serves to energize the system via increasing invertebrate production serving as forage for pallid sturgeon juveniles and other native species
- an increase in structure in the river through the erosive processes (e.g., trees, woody debris)
- in-channel bar formation providing areas of refuge from swift velocities and feeding areas (nursery areas) for various life stages of pallid sturgeon and other native fish species
 - In 2003, the Great Plains Fish & Wildlife Management Assistance Office sampled 72 pallid sturgeon (Fort Randall Reach). Of the 46 entered into the database, 11 were sampled in inside bends.

- benefits to the ecosystem

2. Main Channel Outside Bend: Modifications to the outside bends will provide similar results as the modifications to the inside bends facilitating an increase in the erosion along the shoreline providing:

- Increased habitat available for native chub species believed to be critical to the pallid sturgeon's foraging requirements as they convert from invertebrate feeders to piscivory
- access for larval pallid sturgeon and other native species to passively drift into these areas and utilize diverse mesohabitats critical for survival and recruitment
- an increase in the organic matter that enters the river which serves to energize the system via increasing invertebrate production serving as forage for pallid sturgeon juveniles and other native species
- an increase in structure in the river through the erosive processes (e.g., trees, woody debris)
- in-channel bar formation providing areas of refuge from swift velocities and feeding areas (nursery areas) for various life stages of pallid sturgeon and other native fish species
- benefits to the ecosystem
 - In 2003, the Great Plains Fish & Wildlife Management Assistance Office sampled 72 pallid sturgeon (Fort Randall Reach). Of the 46 entered into the database, 23 were sampled in outside bend macrohabitats.

3. Secondary Channel-Connected: Secondary channels that are connected to the river at both ends provide:

- Increased habitat available for native chub species believed to be critical to the pallid sturgeon's foraging requirements as they convert from invertebrate feeders to piscivory
 - In 2002, approximately 10% of all of the *Macrohybopsis* species sampled by the Nebraska Game and Parks Commission were collected in the Hamburg chute (Steffensen, 2003)
- access for larval pallid sturgeon and other native species to passively drift into these areas and utilize diverse mesohabitats critical for survival and recruitment
- potential spawning areas for native species including the pallid sturgeon
- an increase in the organic matter that enters the river which serves to energize the system via increasing invertebrate production facilitating foraging
- an increase in structure in the river through the erosive processes (e.g., trees, woody debris, etc.)
- connectivity to the floodplain
- unique mesohabitats that have been identified as areas inhabited by pallid sturgeon (e.g., downstream island tip where the secondary channel discharges back into the main river channel)
 - In 2002, the Columbia Fishery Resources Office sample 12 pallid sturgeon of which 3 were associated with secondary channel-connected (island tips).

- In 2003, one of the three pallid sturgeon sampled by the Nebraska Game and Parks Commission was collected in the upper portion of the Hamburg Chute.
- In 2003, the Great Plains Fish & Wildlife Management Assistance Office sampled 72 pallid sturgeon (Fort Randall Reach). Of the 46 entered into the database, 8 were collected in association with secondary channel-connected (1-island tip, 7-channel border).
- benefits to the ecosystem

4. Secondary Channel-Non Connected: Secondary channels that are connected to the river at only one end (either the top or bottom) provide:

- areas of warmer water serving as nursery areas for young-of-the-year native fishes and (e.g., chubs, minnows) and juvenile pallid sturgeon
- refuge from velocities
- connectivity to the floodplain
- potential spawning areas for native species
- areas of increased organic matter (e.g., leaves) energizing these backwater habitats to provide for increased invertebrate production and foraging areas
- benefits to the ecosystem

Table 2 describes the expected macrohabitat type of SWH for each proposed site.

Table 2. Shallow Water Habitat Development Sites and their Respective Habitat Type	
Proposed SWH Site	Macrohabitat Type (s)
Kensler's Bend Reach	Inside Bend
Glovers Point Bend	Secondary Channel-Connected & Inside Bend
Hole-in-the-Rock	Secondary Channel-Non Connected
Blackbird Bend	Secondary Channel-Connected & Inside Bend
Tieville-Middle Decatur Bend	Secondary Channel-Non Connected
Soldier Bend	Secondary Channel- Non Connected
California Bend	Inside Bend
Desoto Bend Dike Mod	Inside Bend
Desoto Bend Lake	Secondary Channel-Connected
Boyer Bend	Inside Bend
Plattsmouth Bend	Inside Bend
Tobacco Bend	Inside Bend
Upper Hamburg Bend	Secondary Channel-Connected & Inside Bend
Lower Hamburg Bend	Secondary Channel-Connected & Inside Bend
Kansas Bend	Secondary Channel-Connected & Inside Bend
Langdon Bend	Secondary Channel-Connected & Inside Bend
NWK Dike Modifications	Inside Bend
Monkey Mountain	Outside Bend
Worthwine Island	Inside Bend

Benedictine Bottoms	Secondary Channel-Connected & Inside Bend
Fort Leavenworth	Inside Bend
Weston Bend State Park	Outside Bend
Kansas City Reach	Inside Bend & Outside Bend
Lisbon—Jameson Island	Secondary Channel-Connected & Inside Bend
Franklin Island	Inside Bend & Outside Bend
Diana Bend	Outside Bend
Marion Bottoms	Inside Bend

Conclusions Regarding 2003 Amended BiOp RPA VII.1.b

As stated above, current biological information on larval drift, the importance of the use of the Platte River as a spawning area, and optimizing development of habitat at priority stocking sites indicate that shallow water habitat below the Platte River will benefit the survival and recovery of the pallid sturgeon. Since the 2000 Biological Opinion, approximately 2,192 acres of new shallow water habitat have either been constructed or are scheduled to be in place by July 2004. Of the total amount, 865 acres are located in the Sioux City to Omaha reach. The Corps is now prioritizing next year's efforts for the Sioux City to Omaha reach but will continue to evaluate other opportunities in the lower river.

We therefore believe that the totality of the Corps' habitat creation efforts are applicable to the implementation of the pallid sturgeon RPA in the 2003 Amended BiOp, thus providing for the Corps' operation of the Mainstem Reservoir System for all project purposes including navigation in July 2004.

Conclusions on other elements of 2003 Amended BiOp RPA

Also discussed at the January 26, 2004, meeting were other elements of the 2003 Amended BiOp RPA. The following elements were discussed:

- Pallid Sturgeon RPA VII.1.b. With the Corps implementation of shallow water habitat described above and operation of the system for all project purposes in 2004, the other provision of the element addressing navigation season suspension is no longer applicable.
- Pallid Sturgeon RPA VII.1.d. This part of the RPA discusses utilizing an experimental spring pulse as information is available to establish an acceptable flow management plan and if hydrologic conditions are suitable in 2004 or 2005 to inform the process for establishing a long-term flow plan. The Corps intends to implement a comprehensive pallid sturgeon research program to inform the process for developing the long term flow plan that would include focused research in reaches where there are existing spring pulses from tributaries. Since additional scientific information will be gathered in other reaches of the river, an experimental spring pulse from Gavins Point is not anticipated to be implemented in 2004 or 2005.

- Incidental Take Statement for Terns and Plovers. The fledge ratio to be used for interior least terns is 0.94 rather than the 0.70 referenced elsewhere in the 2003 Amended BiOp. The Corps also intends to review the "Contingency Plan for Protection of Least Tern and Piping Plover Nest and Chicks" prior to this season. This should result in the Corps continued operation to move tern and plover nest/eggs to higher elevation on the sandbars in accordance with the protocols in the referenced contingency plan.

2003 Amended BiOp Conservation Recommendation Fish Passage at Intake Diversion Dam

A Water Diversion Structure at Intake, Montana (Intake Diversion Dam) is located at river mile 71.1 on the Yellowstone River near Glendive, Montana. Under its current operation and function, the diversion dam draws water from the Yellowstone River primarily facilitating irrigation. The existing structure and rock weir inhibit upstream migration of pallid sturgeon and other native species during most of the year. There may also be entrainment issues of native fish including pallid sturgeon in the event that fish are able to migrate above this Intake structure during spawning migrations.

As part of the 2003 Amendment to the 2000 Missouri river Biological Opinion, there is a Conservation Recommendation concerning the Intake Diversion Dam on the Yellowstone River operated by the Bureau of Reclamation. The Conservation Recommendation is that the Department of the Army is encouraged to work with the Department of the Interior to implement existing plans for reconstruction of this facility to include pallid sturgeon passage facilities. Although this is a discretionary action, the Corps is committed to work with the Department of Interior and its respective agencies to assist them in providing for pallid sturgeon passage at this location.

Renovation of this structure to include fish passage (via Obermeyer Weir) would provide multiple benefits to native fish species including the pallid sturgeon. The Cartersville Dam is the next structure on the Yellowstone River that would inhibit fish passage. This structure is located at river mile 237.4; therefore, renovation of the Diversion Dam structure facilitating fish passage would provide an additional 166 miles of river that is rarely available to native fish at the present time. This would benefit the sub-population of pallid sturgeon in this reach that is separate from the sub-population below Gavins Point Dam. Although spawning of pallid sturgeon has been suspected in Yellowstone River below Intake Diversion Dam, it has never been officially documented. If pallid sturgeon are spawning in the lower Yellowstone River (below Intake Diversion Dam), there may not be adequate downstream area to accommodate the larval drift before reaching the headwaters of Lake Sakakawea. The biological benefits with this modification would include:

- Expanded access to portions of the Yellowstone River for pallid sturgeon and other native fish species that are not available under current conditions and may

provide increased success of spawning and recruitment of native species and the pallid sturgeon.

- Adding 166 available miles of the Yellowstone River would increase the total river availability to native fishes and the pallid sturgeon by approximately 38% within Recovery Priority Management Area #2 (Including the Missouri River).
- Additional length of river that may be an essential component for natural recruitment to occur regarding the larval drift characteristics of the endangered pallid sturgeon, shovelnose sturgeon, paddlefish and many other native species.



DEPARTMENT OF THE ARMY
NORTHWESTERN DIVISION, CORPS OF ENGINEERS
P.O. BOX 2870
PORTLAND, OREGON 97208-2870

Reply to
Attention of:

Planning and Policy Division

2 MAR '04

Ms. Robyn Thorson
Regional Director, Great Lakes-Big Rivers Region
U.S. Fish and Wildlife Service
Bishop Henry Whipple Federal Building
1 Federal Drive, Room 630
Fort Snelling, Minnesota 55111-4056

Dear Ms. Thorson:

This letter is a follow-up to our letter of February 13, 2004, and continued discussions between our two agencies in January and February regarding development of new shallow water habitat and implementation of Reasonable and Prudent Alternatives (RPA) III.a and VII.1.b of the U.S. Fish and Wildlife Service's (Service) 2003 Amendment to the 2000 Biological Opinion (BiOp) on the operation of the Missouri River Mainstem Reservoir System (Mainstem System), the operation and maintenance of the Missouri River Bank Stabilization and Navigation Project, and the operation of the Kansas River Reservoir System (2003 Amended BiOp).

The 2003 Amended BiOp RPA VII.1.b. states that when 1200 acres of new shallow water habitat have been made available, our agencies may consult to modify flows to take advantage of that habitat and more fully meet Corps project purposes. We are committed to implement this RPA element by July 1, 2004, to aggressively address biological needs for pallid sturgeon and to avoid interruption in the navigation season. We understand that only shallow water habitat suitable for the various life stages of young pallid snurgeon constructed since November 2003 can be credited toward implementation of RPA VII.1.b. consistent with the environmental baseline in the 2003 Amended BiOp.

The Corps requests technical assistance from the Service regarding sites we have identified in the enclosure to this letter, in order to make certain that the listed projects provide biological benefits for pallid sturgeon. The sites extend from Ponca to the Osage River, an expansion of the reach in the 2003 Amended BiOp (of Sioux City to the Platte) as explained in our February 13 letter. We ask the Service's concurrence in this modification of the river reach for the 1200 acres of shallow water habitat.

Our staffs worked together with the States of Iowa, Kansas, Missouri and Nebraska to identify sites for development of new shallow water habitat from Ponca to the Osage River. Jointly, we have identified a range of acres for each project that add up to a minimum of 1200 acres of new shallow water habitat that could be constructed between now and July 1, 2004. A foremost tool to construct this habitat is an aggressive program of notching of wing dikes,

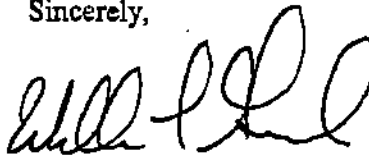
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pursuant to technical assistance from the Service indicating the value of this approach. Notching wing dikes with different notch sizes and depths will make a broad range of new habitat immediately available to pallid sturgeon and other riverine species over a range of flows. The notched wing dikes, located throughout the river, will make the resulting habitat available to young fish that have hatched at different locations with varying larval drift distances. The enclosed document lists sites identified to date and their expected biological responses. This list may expand as we identify additional sites for development before July 1 or for our ongoing effort for shallow water habitat creation, restoration and development, and we will continue to work closely with you on the list and priorities. We have reprogrammed our fiscal year 2004 appropriations to construct this new shallow water habitat as well as to provide for other measures identified in the 2003 Amended BiOp. Please verify that the projects listed in the enclosure address the requirements of RPA VII.1.b.

We appreciate the Service's agreement to assist the Corps to achieve our goal of providing the habitat identified in RPA VII.1.b. This will enable the Corps and Service to consult on the operation of the Mainstem System and provide for all congressionally authorized purposes this summer. We appreciate your reply by March 4, 2004, so that the Corps' plans for pallid sturgeon habitat development can proceed immediately and succeed by July 1, 2004.

As we implement the conditions of the 2003 Amended BiOp, it is important that we continue to seek the input of basin states, tribes and stakeholders. An example of the benefits of this coordination is our joint discussions this last week with the states, where the Corps and the Service identified additional sites available for development of shallow water habitat this year. I believe that this cooperative approach optimizes our shared capabilities to help the survival and recovery of the pallid sturgeon, interior least tern and piping plover. Should you or your staff have any questions or need any additional information, please do not hesitate to contact me, or Mr. David Ponganis of my staff.

Sincerely,



William T. Grisoli
Brigadier General, U.S. Army
Division Engineer

Enclosure

March 2, 2004

ENCLOSURE
BIOLOGICAL AND ENGINEERING INFORMATION
2003 AMENDMENT TO THE MISSOURI RIVER 2000 BIOLOGICAL OPINION

The 2003 Amended BiOp RPA VII.1.b indicates that when 1,200 acres of new shallow water habitat have been made available that the agencies may consult to modify flows to take advantage of that habitat and more fully meet Corps project purposes. The information below provides site-specific information on the proposed development of over 1,200 acres of new shallow water habitat. Based on biological information in the Corps letter of February 13, 2004, and subsequent discussions, it is the Corps understanding that the U.S. Fish and Wildlife Service (Service) concurs that providing habitat in the Ponca to Osage River reach of the Missouri River is biologically warranted for implementing RPA VII.1.b.

Shallow Water Habitat

Based on recent discussions with the States of Iowa, Kansas, Missouri and Nebraska, the Corps and the Service have jointly identified approximately 1,235 to 1,914 acres of new shallow water habitat (SWH) to be constructed from November 2003 to July 1, 2004. Table 1 identifies the location and range of estimated shallow water habitat to be available by July 1, 2004.

Site	New Acres of SWH Online between November 2003 to July 1, 2004
Ponca	40-80
Winnebago/Snyder	20-25
Tieville-Middle Decatur Bend	10-308
Soldier Bend	20-25
Tyson Bend	20-25
Desoto Bend Dikes	25-30
Tobacco Bend	15-20
Upper Hamburg Bend	35-40
Lower Hamburg Bend	50-55
Langdon Bend	15-18
Derooin Bend	25-30
Rush Bottoms	5
NWO Dike Notching	120-145
NWK Dike Notching	300-400
Bob Brown	5
Monkey Mountain	40-60
Worthwine Island	32-48
French Bottoms	5
Benedictine Bottoms	40-60
Fort Leavenworth	28-35
Weston Bend State Park	30-40

March 2, 2004

Kansas City Reach	100
Liberty Bend	20-30
Baltimore Bend	20
Grand Pass	20-30
Lisbon - Jameson Island	40-60
Franklin Island	25-35
Diana Bend	25-35
Overton Bottoms South	20
Eagle Bluffs	50-80
Marion Bottoms	25-35
Smokey Waters	10
TOTAL	1235-1914

Each site differs in the type of work planned, the resulting habitat, and ultimately the biological output, especially for pallid sturgeon. A variety of biological benefits will be provided as a result of the Corps shallow water habitat development resulting from dike notching efforts. Top-width widening in conjunction with inside bend macrohabitats will provide diversity in both depth and velocity at various river stages as well as facilitate the natural erosive processes along the river's banks increasing the amount of sediment, organic matter and woody debris available to the river. Varying notch sizes (depending upon the availability of land) will provide diversified habitat downstream of each notch.

Each dike notch will result in the formation of a variety of mesohabitats within the inside bend. A scour hole or pool will be created providing a range of both depth and velocities available to pallid sturgeon at various life stages. The channel border area will become more diversified resulting in a mosaic of depths and velocities. The minimal existing bar habitat (<1.2 meters) will be increased along with a range of velocities and intermixing of sediments through the erosive processes. The combination of these habitats provides a variety of available habitat for young-of-the-year, juvenile and adult pallid sturgeon.

The flow through the notches provides benefits in flushing the adjacent area by maintain clean sand substrates typically utilized by pallid sturgeon. Strategically placed notches adjacent to islands can be utilized to improve flows and fish movement in existing secondary connected channels that currently lack adequate flows. These efforts will help restore much of the dynamic processes to the river that have been lacking from the channelized river. Active sediment transport, formation of submerged sand bar (dune), depth and velocities that mimic the historical river will result from the notching efforts providing diversity beneficial for the pallid sturgeon and native fish community.

Further detailed information on other types of work and resulting biological output was provided in the Corps' letter to the Service dated February 13, 2004.

Table 2 describes the expected macrohabitat type of SWH for each proposed site.

March 2, 2004

Table 2. Shallow Water Habitat Development Sites and their Respective Habitat Type	
Proposed SWH Site	Macrohabitat Type (s)
Ponca	Inside Bend
Winnabago/Snyder	Inside Bend
Tieville-Middle Decatur Bend	Secondary Channel-Non Connected
Soldier Bend	Secondary Channel- Non Connected
Tyson Bend	Secondary Channel- Non Connected
Desoto Bend Dike Mod	Inside Bend
Tobacco Bend	Inside Bend
Upper Hamburg Bend	Secondary Channel-Connected & Inside Bend
Lower Hamburg Bend	Secondary Channel-Connected & Inside Bend
Langdon Bend	Secondary Channel-Connected & Inside Bend
Deroin Bend	Inside Bend
Rush Bottoms	Inside Bend
NWO Dike Modifications	Inside Bend & Outside Bend
NWK Dike Modifications	Inside Bend & Outside Bend
Bob Brown	Inside Bend
Monkey Mountain	Outside Bend
Worthwine Island	Inside Bend
French Bottoms	Outside Bend
Benedictine Bottoms	Secondary Channel-Connected & Inside Bend
Fort Leavenworth	Inside Bend
Weston Bend State Park	Outside Bend
Kansas City Reach	Inside Bend & Outside Bend
Liberty Bend	Outside Bend
Baltimore Bend	Inside & Outside Bend
Grand Pass	Inside & Outside Bend
Lisbon—Jameson Island	Secondary Channel-Connected & Inside Bend
Franklin Island	Inside Bend & Outside Bend
Diana Bend	Outside Bend
Overton South	Inside Bend & Secondary Channel- Connected
Eagle Bluffs	Inside Bend
Marion Bottoms	Inside Bend
Smokey Waters	Inside Bend



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111-4056

FWS/RD

March 5, 2004

Brig. General William T. Grisoli
Corps of Engineers
Northwestern Division
P.O. Box 2870
Portland, Oregon 97208-2870

Dear General Grisoli:

The U.S. Fish and Wildlife Service (Service) has received your letters of February 13 and March 2, 2004, regarding development of new shallow water habitat and implementation of Reasonable and Prudent Alternatives (RPA) elements III.a. and VII.1.b. of the Service's 2003 Amendment to the 2000 Biological Opinion on the Operation of the Missouri River Mainstem Reservoir System, the Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project and the Operation of the Kansas River Reservoir System. Your letters reflect the continued discussions between our agencies in January, February and this week.

Your letter correctly cites the 2003 Biological Opinion RPA element VII.1.b., that states that when 1200 acres of shallow water habitat have been made available, our agencies may consult to modify flows to take advantage of that habitat and more fully meet Corps' project purposes. On January 26, 2004, the Service and the Corps met in Omaha, Nebraska to discuss the Corps' commitment to implement this RPA element by July 1, 2004. This schedule is the prerogative of the Corps. The Service supports this decision because aggressive implementation of RPA element VII.1.b. and acceleration of shallow water habitat development both address an immediate need for survival and recovery of the pallid sturgeon. The Service will continue to provide technical assistance and cooperation to help this effort succeed, in addition to assistance to address all aspects of the 2000 Biological Opinion and 2003 Amended Biological Opinion.

As discussed in Omaha and reflected in your letter of February 13, 2004, the Corps has provided new information to support a request that RPA element VII.1.b. be applied from Ponca State Park to the mouth of the Osage River, and not be limited to the Sioux City to Platte River reach identified in the 2003 Amended Biological Opinion. We evaluated this request and we concur. Comments supporting our concurrence are in the enclosure. This concurrence will change our Amended Biological Opinion, and the appropriate process for change is reinitiation of consultation. Therefore, the Service will provide full documentation supporting our concurrence in mid-June when the Corps reinitiates

consultation in association with a request for flow modification. The amendment at that time will be consistent with this concurrence.

The projects listed in your letter of March 2, 2004, reflect work by the Corps, the Service, and state partners to identify potential sites generally suitable for the purpose of implementing RPA element VII.1.b. The list of projects can change as new information becomes available, additional opportunities arise, or circumstances change, and we agree to work with you and partners to continue identifying habitat project sites and revising the list of potential projects. It is our opinion that the list in the attachment to your March 2, 2004, letter identifies a sufficient number of sites that could satisfy RPA element VII.1.b. by July 1, 2004.

The Service will work with the Corps to evaluate progress and acreage for each habitat project as it is accomplished; consultation for a flow change will take into account the accumulated habitat modifications and their biological support for a flow proposal. Habitat projects should be constructed at elevations for the summer flow level that you will be proposing, to ensure habitat will be available to young pallid sturgeon as required in RPA element VII.1.b.

In addition to the immediate gain in habitat for pallid sturgeon, the Service also supports aggressive habitat development by the Corps to address RPA element VII.1.b. because it provides an outstanding opportunity to implement adaptive management, as required in the 2003 Amended Biological Opinion. For example, the substantial number of dike notchings in the coming months provides an opportunity to evaluate aspects of these habitat modification measures. The Service recommends that the Corps use research and monitoring resources identified for 2004 to help inform and improve subsequent habitat development. We encourage the Corps to work with the Service, states, tribes and the U.S. Geological Survey to direct biological monitoring to these locations.

Along with the efforts of Corps and Service staff to address implementation, I particularly appreciate the expertise and energy contributed by the states of Iowa, Nebraska, Kansas and Missouri to help identify projects for shallow water habitat development. The U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS), has also joined this effort, providing an opportunity for private landowners to join local, state and federal governments in conservation along the Missouri River. Our thanks to these partners is profound, and the Service joins the Corps in the commitment to maintenance of these relationships and responsiveness to partner concerns as we move forward with implementation.

Our focus in the past two months has been identification of shallow water habitat projects in order to address RPA element VII.1.b., and there has been significant progress toward the Corps' goal of implementation of this element by July 1. We are also committed to

Brig. General William T. Grisoli

3

providing technical assistance to the Corps to address all the other elements of the RPA, and reasonable and prudent measures for birds. Implementation of the 2003 Amended Biological Opinion is a goal we can jointly address, and we lend our full cooperation to that effort.

Sincerely

A handwritten signature in black ink that reads "Robyn Thorson". The script is cursive and fluid, with the first name and last name clearly distinguishable.

Robyn Thorson
Regional Director

Enclosure

Enclosure

U.S. Fish and Wildlife Service
2000 Biological Opinion and 2003 Amended Biological Opinion
Missouri River

Technical Assistance, Corrections and Changes
March 5, 2004

The following information is provided in association with the 2000 Biological Opinion and 2003 Amended Biological Opinion. Technical assistance is provided to help the Corps with implementation of the Opinions. Changes and corrections to the 2003 Amended Biological Opinion are noted, and these constitute official modifications that will be finalized when the Service and Corps enter into formal consultation on proposed changes in flows.

Shallow Water Habitat Project Characteristics (technical assistance)

The Service e-mailed guidance to the Corps on February 13, 2004, to assist engineers and biologists working together to identify habitat projects. This guidance was targeted at restoration of cutoff channel areas, and the information is reiterated here as technical assistance to the Corps:

Restoration of cutoff channel habitats for shallow water classification needs to incorporate an active bed transport that functions much like secondary or main channels, that is sustainable over the long term. Flows need to be sufficient to create a mosaic of shallow, submerged sand bar (sand dune) habitats that mimic the historical frequency distribution of depths and velocities. These shallow sandbar habits that are closely associated with a thalweg are typically where pallid sturgeon juveniles and young of the year shovelnose sturgeon are found. These habitats provide the fish access to the variety of depths and flows dependant on activity and life stage. Connectivity with the main channel needs to be maintained in order to allow movement of fish among these habitats under a variety of flow conditions, seasons and species' needs over all life stages.

Pallid sturgeon prefers areas where flows converge (e.g., main channel and side channel, island tips, tributary mouths). Ideally, habitat should be available over a wide range of flows. An area may provide more than one type of habitat for various life stages as the depths and velocities in that area change in response to river discharge. Thus variable river flow is as large a factor in abundance, location, and longevity of suitable habitat as the geomorphology that underlies it.

Preferred shallow water habitats should be in channel with the above mentioned characteristics.

Existing examples of secondary channels that have experienced success are the Lisbon Bottoms prior to modification in 2000 and Hamburg Bend. There is both biological and physical information from those areas, as well as some historic

geomorphic data on DeSoto Bend (as the river), to explore potential future pallid sturgeon habitat restoration opportunities in that area. While feasible, such efforts would require considerable technical coordination, modeling, monitoring and assessment to adequately implement a project.

Modeling to help inform the design process and describe project outputs is critical.

The list of projects in the attachment to the March 2, 2004 letter from the Corps includes a substantial amount of dike modification work; the Service strongly supports these projects. The Service e-mailed the Corps on March 1, 2004, with information on the benefits of dike modifications, and that information is reiterated here as technical assistance to the Corps:

The Service supports notching as an effective tool to contribute to pallid sturgeon habitat in the main channel of the river by diversifying aquatic habitat downstream of the notches. Based on discussions with the Corps regarding their most recent proposal, notches would be between 50' and 75' wide with a minimum depth of - 4' CRP. The size of the notch would depend, to a large extent, on adjacent land ownership (i.e., larger more landward notches on public lands). The results would depend on the specific location and size, but in general notches would develop a scour downstream and an associated shoal or shallower area downstream of that. The notches would also favorably modify velocities in the area around the notches. Notches in L-dikes can help flush the surrounding area, maintaining clean sand substrates. Notches in dikes at the ends of islands can improve flows and fish movement to the existing side channels.

The Service's Fisheries Management Office in Columbia, Missouri, (CMFRO) has documented sturgeon associated with various types of notches and believe the notches improve habitat for a number of native river species. While the true value of larger notches will likely be realized with higher flows, notches can begin responding immediately, and a variety of notch sizes and depths should help take advantage of varying habitat over a range of flows. Located throughout the lower river, the resulting habitat would also be available to young fish that hatched at different locations, and experienced varying larval drift distances. Modifications of these dikes can be accomplished this winter and spring and meet the Corps' goal of 1200 new acres of shallow water habitat available to sturgeon by July 1, 2004.

Shallow Water Habitat Project List (technical assistance)

The projects listed by the Corps in the attachment to the March 2, 2004, letter identify potential sites generally suitable for the purpose of implementing RPA element VII.1.b. The Service does not consider this list as exclusive, because new projects can be identified as partners continue to work with the Corps and the Service to address habitat needs for pallid sturgeon survival and recovery. There are a few projects on the list that may prove to be infeasible in 2004 (due to ownership issues, intended uses, required processes, logistics, or other obstacles) but would be viable in future years as ongoing habitat development requirements (from the 2000 Biological Opinion) are addressed.

Reach of River for Shallow Water Habitat Projects (future amendment)

In a meeting with the Corps in Omaha, Nebraska, on January 26, 2004 the Service agreed to evaluate information regarding the Corps' request to extend the geographic scope for implementing RPA element VII.1.b. The RPA had identified the river reach from Sioux City to Omaha as the exclusive area for developing 1200 acres of shallow water habitat available to sturgeon. The letter from the Corps to the Service dated February 13, 2004, requested extending that from Sioux City to the mouth of the Missouri River, but immediately thereafter the Corps modified the request, shortening it to include only the river reaches from just above Sioux City (Ponca State Park) to the confluence with the Osage River. This request is documented in the Corps' letter of March 2, 2004.

The Service evaluated the materials from the Corps' February 13 letter, along with our administrative record and with the new information about the Corps' commitment to an accelerated pace for accomplishing the 1200 acres of habitat development. The Corps also proposed to continue to focus priority in the Sioux City to Omaha reach in 2005. Based on this evaluation, as documented below, it is the opinion of the Service that there is sufficient justification to modify RPA element VII.1.b. to include the Missouri River reaches from Ponca State Park to the mouth of the Osage River.

The Corps analysis conducted for the 2001 Revised Draft EIS for the Master Water Control Manual indicated that approximately 1200 acres of habitat would be lost in the Sioux City to the Osage River reach of the river by not implementing the summer low flow RPA element of the 2000 Biological Opinion. The Corps proposed to create this 1200 acres of habitat through mechanical means instead of through flow manipulation. The Service utilized this analysis, in part, to establish the 1,200 acre requirement in RPA element VII.1.b. The Service did not object to mechanically creating the habitat because habitat is a limiting factor for sturgeon. In formulating the RPAs the Service concluded that mechanically created habitat should be accomplished where pallid sturgeon shallow water habitat is least available.

Larval drift is imprecise but an important factor in considering habitat development priority areas. Information provided indicates that larval and post-larval fish exhibit different drifting and migration strategies. Once larval fish "fall out" of the stream flow and their yolk sac has been absorbed they must be in suitable habitat that provides food and shelter immediately. As larval fish transition into a post-larval stage they may likely move or be transported further to different areas. Without suitable habitat, there is no recruitment into the population. Since larvae and post-larval fish will have a wide distribution, making habitat available where it currently does not exist and providing a wide distribution of potential habitat is a biologically appropriate strategy.

The next issue is location of that habitat. The available science and recent developments related to pallid sturgeon larval drift indicates the need to have larval/juvenile habitat distributed throughout the river in order to take advantage of spawning events. Recent research below Fort Peck Dam confirm the fact that pallid sturgeon exhibit a drifting behavior geared toward distributing individuals throughout the river system. Thus, when spawning occurs below Gavin's Point Dam, studies suggest that larvae would eventually

be distributed throughout the lower river from the dam to the mouth. In two reaches of the river below Gavin's Point Dam, a critical mass of diverse aquatic habitat already exists (Gavin's Point to Ponca State Park, and the Osage River to the mouth). In between Ponca and the Osage there is evidence of spawning upstream, but these river miles provide limited or no suitable habitat for larval fish. That is why these reaches are the target for habitat development.

The reaches above the Platte (Ponca to Omaha) and below the Platte (Omaha to the Osage) are both valuable for pallid sturgeon. The reach above the Platte was identified as the highest priority area for habitat projects because it has the least suitable habitat for pallid sturgeon at this time, and developing it would provide another significant additional larval and juvenile habitat area (by making it available to young pallid sturgeon). The Platte River is suspected to provide pallid sturgeon spawning areas. Therefore, areas below the Platte are essential for habitat development based on the likelihood of use and benefit. But biologically the reaches above and below the Platte are comparable, and in the interest of establishing as much usable habitat as possible where there is high potential for use, both areas merit emphasis.

When the 2003 Amended Biological Opinion was written, the Service did not anticipate that the Corps would implement RPA element VII.1.b. within six months of the issuance of that Opinion. This accelerated pace for implementation is advantageous for addressing habitat needs for pallid sturgeon because of the dire status of the sturgeon population, and limiting that to Sioux City to Omaha is no longer prudent. We continue to emphasize the value of the reach above the Platte River for long-term survival of the species, but given the short-term habitat accomplishments planned by the Corps before this summer, the larger reach (Ponca to Osage) affords higher potential for short-term benefits to the sturgeon, without undermining long-term benefits.

In examining this matter, the Service has utilized the same data that we used in formulating the 2003 Amended Biological Opinion. We are in agreement with the Corps to modify the geographic reach of river for habitat development in RPA element VII.1.b. As discussed earlier, when the Corps proposes a change in operational flow for this summer based on the biological relationship between the flow and the habitat that has been developed, we will formally consult and formalize this modification to the 2003 Amended Biological Opinion, consistent with this conclusion, by mid-June.

Adaptive Management (technical assistance)

As noted in the 2003 Biological Assessment provided by the Corps in November, adaptive management is an essential part of the Corps' approach to conservation responsibilities. The Service believes that the Corps' habitat restoration program this year will yield substantial biological benefits, along with new information and questions. The Service is prepared to assist the Corps in developing hypotheses to be tested through an adaptive management framework. We recommend that the Corps meet with the Service and U.S. Geological Survey as soon as practicable to identify research resources for monitoring and evaluating this new habitat. New information can be used to inform and support subsequent decisions.

Spring experimental pulse (clarification)

In the 2003 Amended Biological Opinion the Service stated that a spring pulse is not required in 2004 or 2005; we encouraged the Corps to conduct an experimental spring pulse as part of adaptive management. This experiment could yield biological information valuable to other flow management plan processes outlined in other elements of the RPA. A controlled test could help inform the Corps and stakeholders of issues (if any) that need to be specifically addressed, and a test could beneficially assist in conditioning habitat for the listed birds and the sturgeon. This is not a requirement, and although monitoring and evaluative protocols are not likely to be ready for 2004, we encourage consideration of the benefits of implementing an experimental spring pulse in 2005 as an adaptive management measure.

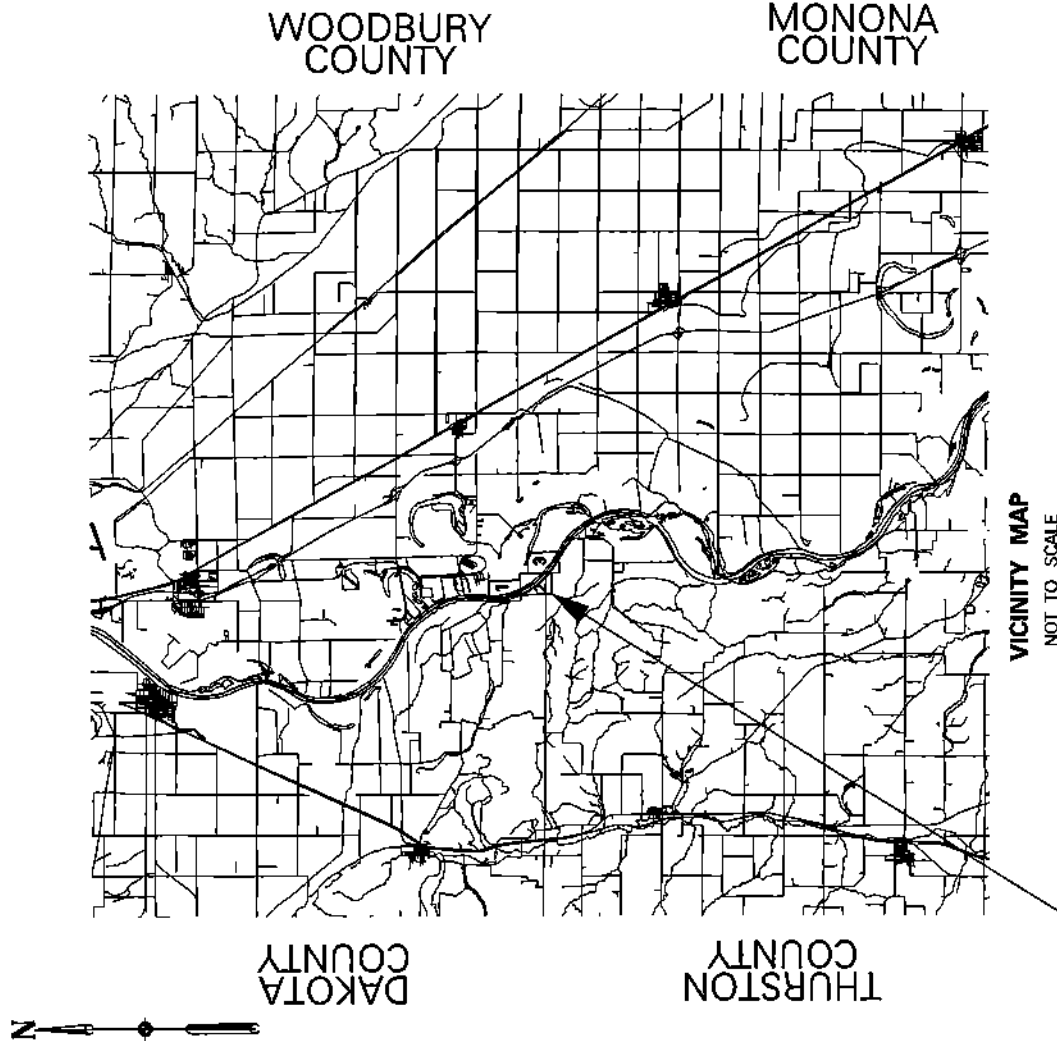
Fledge Ratio (correction)

The Incidental Take Statement for the least tern has two anticipated levels of incidental take. One level deals with anticipated take resulting from flooding of nests - the anticipated level is 60 eggs per year or no more than 180 over 3 consecutive years. The other level in the 2003 Amended Biological Opinion is associated with incidental take other than flooding that is influenced by (but not directly attributable to) Corps operations. It was determined that the best index to measure this level of anticipated take was a fledge ratio. Using data from the past 10 years of tern monitoring by the Corps yields the average fledge ratio. A fledge ratio of 0.94 chicks per pair over a 5 year running average is the threshold for this form of incidental take.

APPENDIX B

DETAILED PLANS

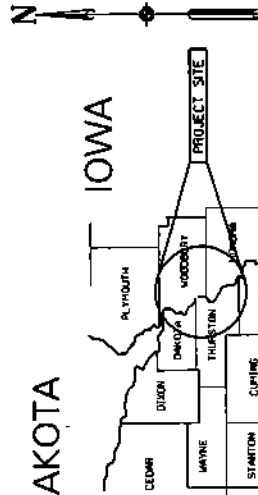
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



VICINITY MAP
NOT TO SCALE

PROJECT SITE

SOUTH DAKOTA



NEBRASKA

MISSOURI

LOCATION MAP
NOT TO SCALE

LEGEND

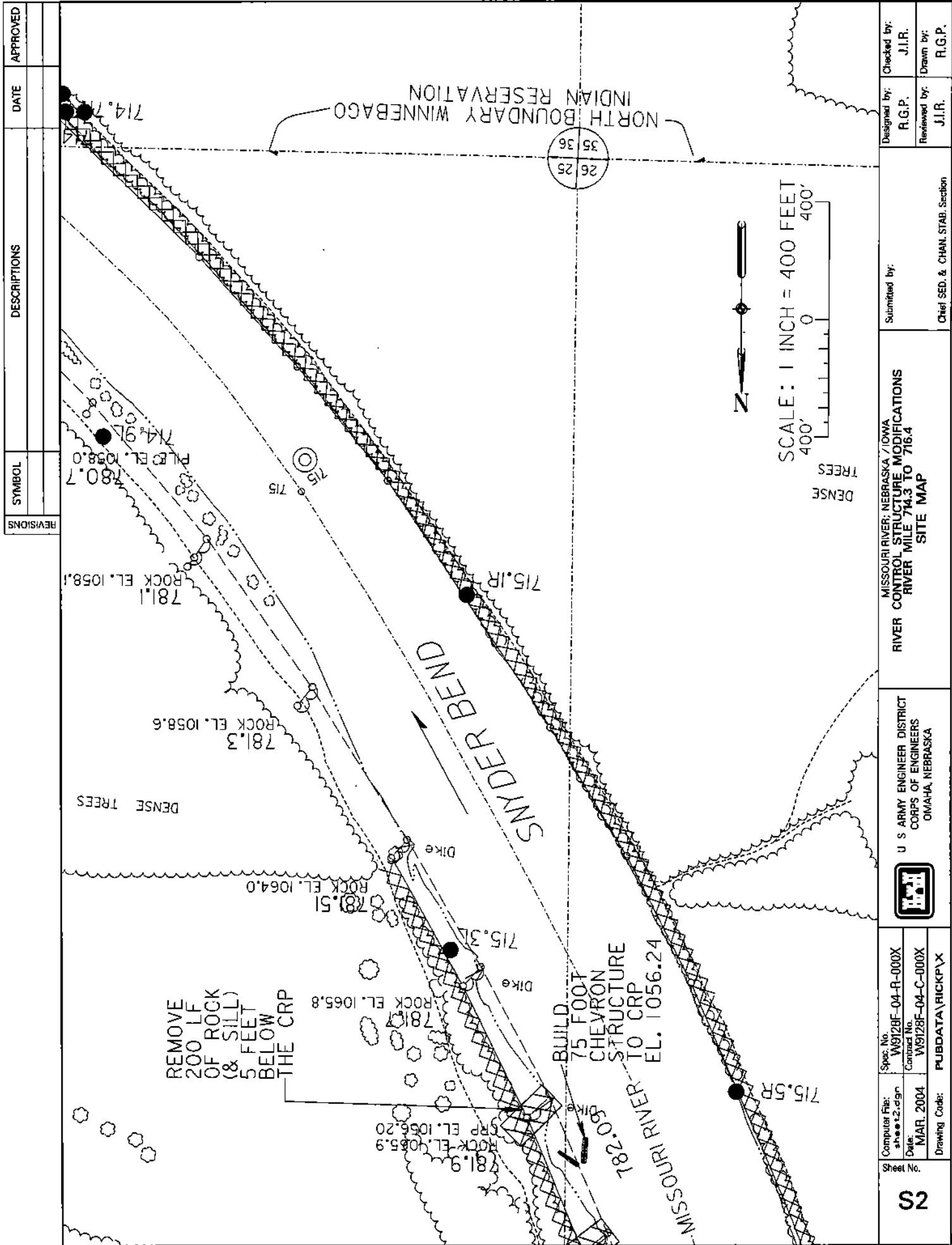
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- STONE FILL DIKE OR REVETMENT OR
- PILE DIKE STONE FILL
- PILE REVETMENT
- PILE REVETMENT - STONE FILL
- TOE TRENCH OR STANDARD REVETMENT OR
- REINFORCED STD. REVET. OR ACCRETMENT
- ASPHALT REVETMENT
- DESIGNED STABILIZED CHANNEL LINE
- BLUFF LINE
- 1960 CHANNEL MILEAGE
- BEND CHANGE

615.8
CRP

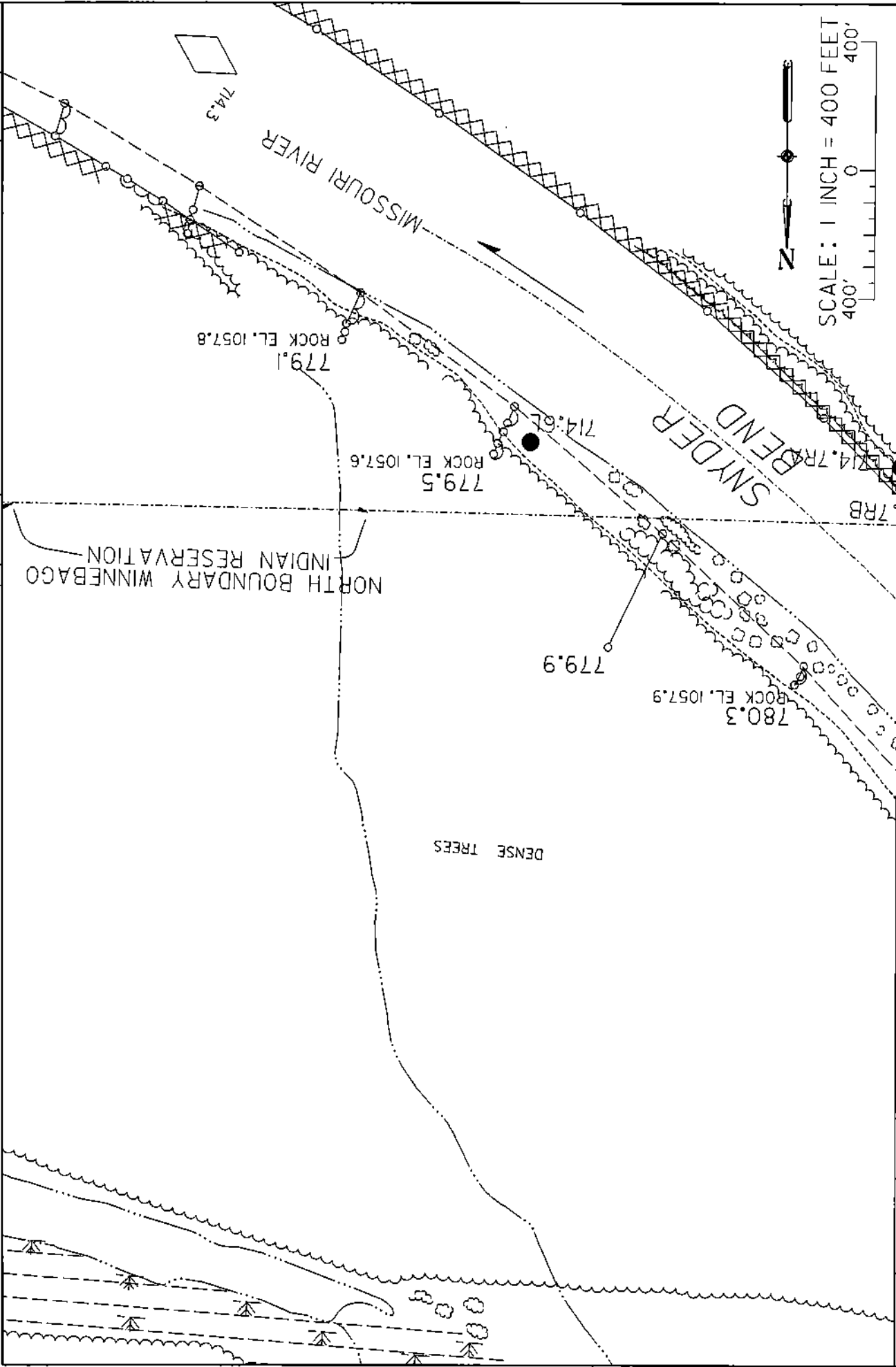
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THIS IS THE CONSTRUCTION REFERENCE PLANE WHICH REPRESENTS A SYNTHESIZED WATER SURFACE PROFILE OF A STEADY DISCHARGE THAT IS EQUALED OR EXCEEDED 75% OF THE TIME DURING THE NAVIGATION SEASON (APRIL - NOVEMBER).

50	Sheet No.	Computer File: SHEET/BLDG	Spec. No. W912BF-04-R-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER; NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 74.3 TO 716.4 SITE MAP	Submitted by:	Designed by: R.G.P.	Checked by: J.I.R.
	Date: MAR. 2004	Contract No. W912BF-04-C-000X	Reviewed by: J.I.R.				Drawn by: R.G.P.		
	Drawing Code: PUBDATA/RICKP/X	Chief SED. & CHAN. STAB. Section							



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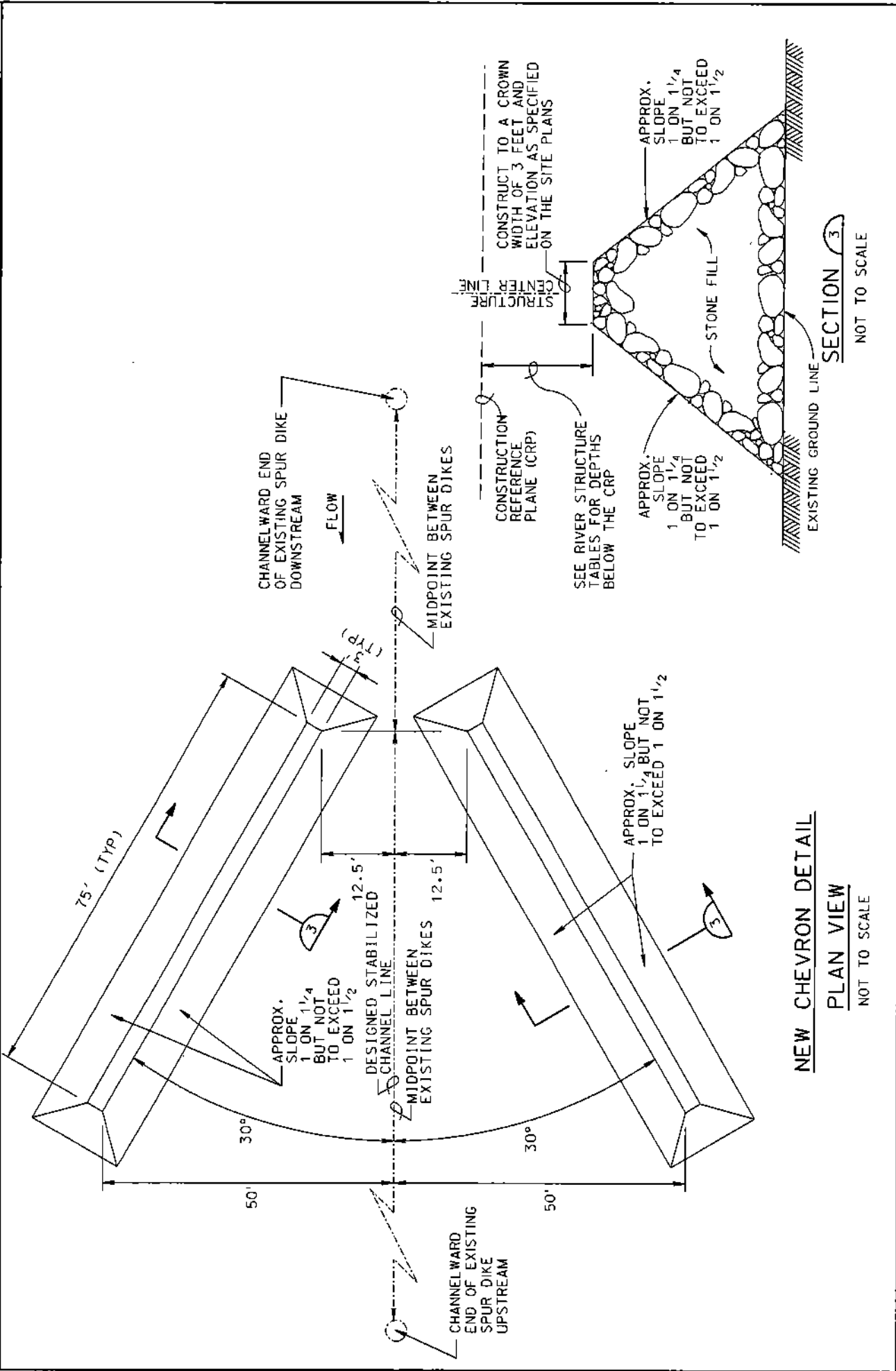
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						R.G.P.	J.I.R.
						Reviewed by:	Drawn by:
				Chief SED. & CHAN. STAB. Section		J.I.R.	R.G.P.
Computer File: sheet3.dgn	Spec. No. W9128F-04-R-000X						
Date: MAR. 2004	Contract No. W9128F-04-C-000X						
Drawing Code:	PUBDATA\RICKP\X						

RIVER STRUCTURE TABLE

Sheet No. S4	Computer File: Sheet 4.DGN	Spec. No. W9128F-04-R-000X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 714.3 TO 716.4 SITE MAP	Submitted by:	Designed by: R.G.P.	Checked by: J.I.R.
	Date: MAR. 2004	Contract No. W9128F-04-C-000X			Reviewed by: J.I.R.	Drawn by: R.G.P.	
	Drawing Code: PUBDATA\RICKP\X						

S4

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

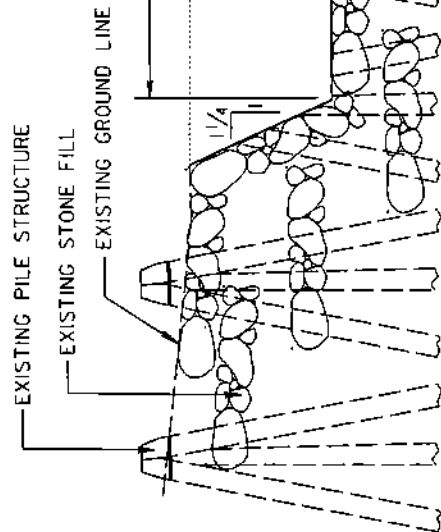


NEW CHEVRON DETAIL
PLAN VIEW
 NOT TO SCALE

Computer File: SHEETS.DGN Date: MAR. 2004 Sheet No.	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X Drawing Code: PUBDATA\PIKCP\X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 74.3 TO 76.4 CHEVRON STRUCTURE	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

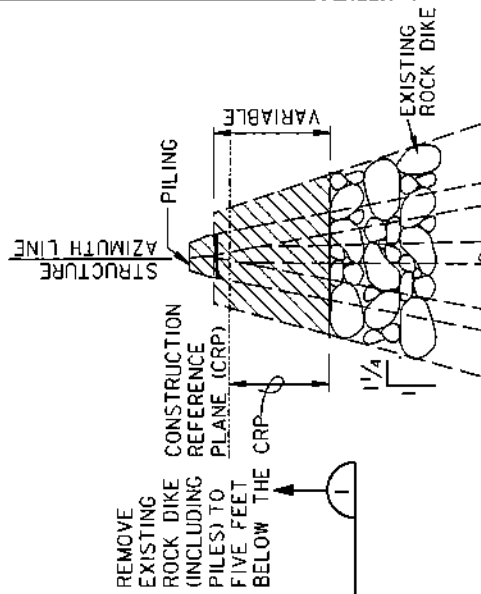
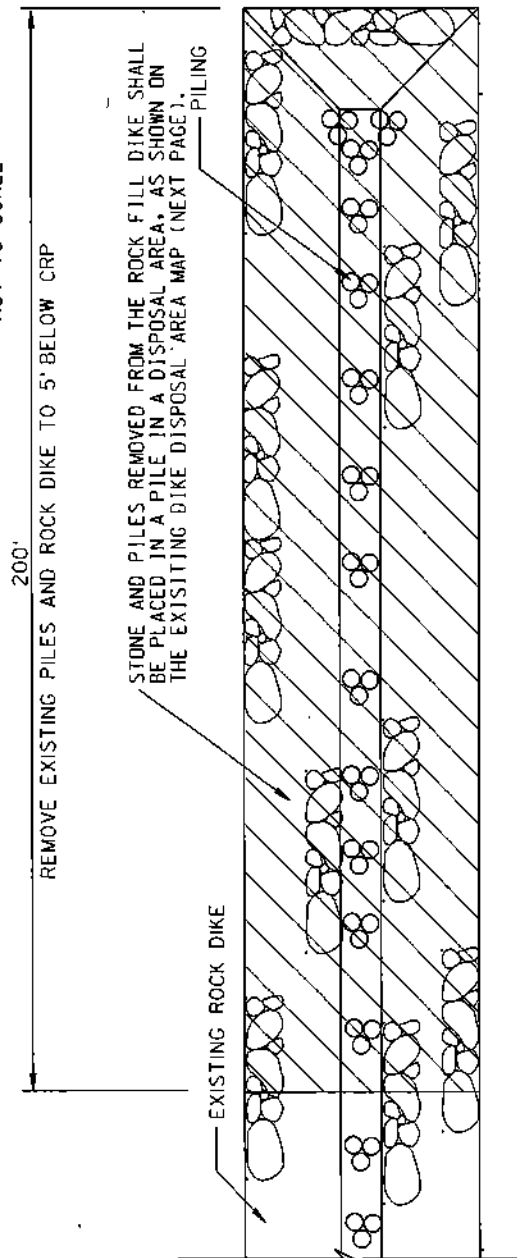
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IF THE ROCK DIKE HAS A ROCK SILL INSTALLED AT THE END OF THE DIKE THE CONTRACTOR SHALL REMOVE THE ROCK SILL TO AN INVERT ELEVATION 5' BELOW CRP IN ADDITION TO THE 200 FEET REMOVED FROM THE ROCK DIKE.



SECTION 1

NOT TO SCALE



DIKE REMOVAL DETAIL

PLAN VIEW

NOT TO SCALE

SECTION 2

NOT TO SCALE

Computer File: SHEET 6.DGN Date: MAR. 2004 Drawing Code: PUBDATA/RICKP/X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 744.3 TO 746.4 EXISTING DIKE REMOVAL DETAILS	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

SYMBOL	DESCRIPTIONS	DATE	APPROVED

REVISIONS

THE DISPOSAL AREA FOR ALL REMOVED MATERIAL (EXCESS EXCAVATION, STONE, TREES AND BRUSH, ETC.) SHALL BE PLACED JUST DOWNSTREAM OF THE EXISTING STRUCTURE.

— RIVER BANK LINE
— TREE LINE

200'

REMOVE EXISTING PILES AND ROCK DIKE TO 5' BELOW CRP

VARIES

VARIES

— EXISTING ROCK DIKE

PILING

← RIVER FLOW

CLEAR AND GRUB AND THEN EXCAVATE TO 5' BELOW THE CRP

THE CONTRACTOR SHALL DISPOSE OF ALL REMOVED TIMBER PILES AT LEAST 100 LF LANDWARD FROM THE END OF THE DIKE EXCAVATION. THE CONTRACTOR WILL DIG A HOLE AND PLACE THE PILES INSIDE AND BACKFILL WITH A MINIMUM COVER OF AT LEAST 5 FEET OVER THE TOP OF THE PILES. THE CONTRACTOR CAN ALSO DISPOSE OF REMOVED TIMBER PILES AT AN APPROVED LANDFILL AT HIS OWN EXPENSE.

THE CONTRACTOR CAN PLACE ONLY WASTE ROCK ALONG SIDE THE REMAINING DIKE OR DIG A TRENCH (5 TO 6 FEET DEEP) BY SIDE CASTING THE SOIL AND ALLOWING THE RIVER TO RECLAIM IT. THE CONTRACTOR THEN CAN ROLL THE WASTE ROCK INTO THE TRENCH. IN NO CASE WILL THE CONTRACTOR LENGTHEN THE DIKE.

DIKE DISPOSAL AREA

PLAN VIEW

NOT TO SCALE

<div> <div>Computer File: W9128F-04-R-000X</div> <div> <div>Sheet: 7.00GN</div> <div>DATE: MAR, 2004</div> </div> </div>	<div> <div>Spec. No: W9128F-04-R-000X</div> <div>Contract No: W9128F-04-C-000X</div> </div>	<div> <div>Computer File: W9128F-04-R-000X</div> <div> <div>Sheet: 7.00GN</div> <div>DATE: MAR, 2004</div> </div> </div>	<div> <div>Drawing Code: PUBDATA\RICKP\X</div> </div>	<div> <div>U S ARMY ENGINEER DISTRICT</div> <div>CORPS OF ENGINEERS</div> <div>OMAHA, NEBRASKA</div> </div>	<div> <div>MISSOURI RIVER: NEBRASKA / IOWA</div> <div>RIVER CONTROL STRUCTURE MODIFICATIONS</div> <div>RIVER MILE 714.3 TO 716.4</div> <div>EXISTING DIKE DISPOSAL AREA MAP</div> </div>	<div> <div>Submitted by:</div> <div>Chief SED & CHAN STAB Section</div> </div>	<div> <div>Designed by:</div> <div>R.G.P.</div> </div>	<div> <div>Checked by:</div> <div>J.I.R.</div> </div>	<div> <div>Drawn by:</div> <div>R.G.P.</div> </div>


REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

BENCH MARK INFORMATION

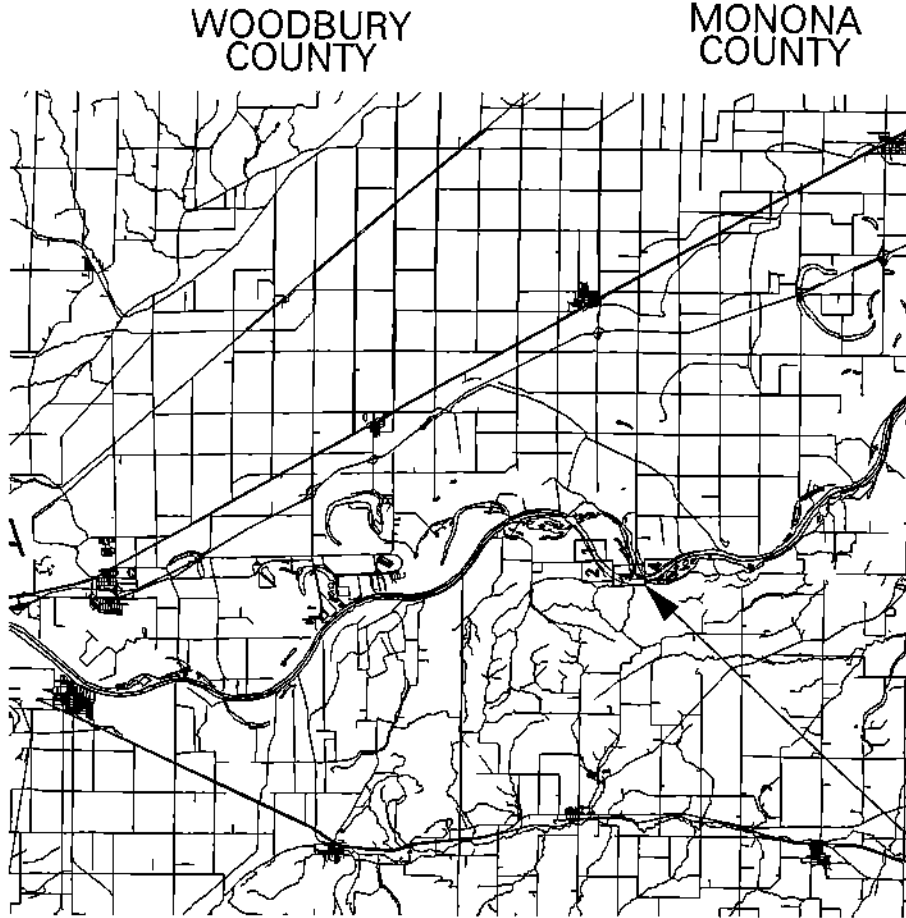
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714.7	R	15373655.95095	731956.60381	1068.00000
714.9	L	15374740.94194	731832.50424	1074.76000
715.1	R	15375302.08485	730598.43267	1068.27000
715.3	L	15376514.20855	730658.83927	1063.21000
715.5	R	15376997.68912	729677.85700	1069.27000
715.7	L	15378342.67270	729961.74811	1063.85000
715.9	R	15379283.90588	728985.04111	1069.51000
716.1	L	15380314.31211	729613.25981	1063.55000
716.3	R	15381238.88757	728937.18924	1069.03000

CONDITION OF MISSOURI RIVER CONTROL POINTS:

1. NO EFFORT HAS BEEN MADE TO MONITOR THESE POINTS. SOME HAVE ERODED INTO THE RIVER WHILE OTHERS MAY BE BURIED UNDER 1-5 FEET OF SEDIMENT.
2. EACH CONTROL POINT IS A 3-1/4 INCH DIAMETER CORPS OF ENGINEERS BRASS CAP. THEY ARE STAMPED WITH THE RIVER MILE AND LEFT/RIGHT BANK.
3. THE CONTROL POINTS ARE MARKED WITH ORANGE FIBERGLASS WITNESS POSTS (CARSONITE BRAND). THE POSTS WERE TYPICALLY SET 3-8 INCHES LANDWARD OF THE BRASS CAP.
4. HORIZONTAL CONTROL: UTM ZONE 15, NAD 83
VERTICAL CONTROL: NGVD 29 (ALSO REFERENCED AS "MEAN SEA LEVEL" DATUM)

S8 Sheet No.	Computer File: Sheet: B.DGN Date: MAR. 2004 Drawing Code:	Spec. No: W9128F-04-R-000X Contract No: W9128F-04-C-000X PUBDATA/RICKP/X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 74.3 TO 76.4 BENCHMARK INFORMATION	Submitted by Chief SED. & CHAN. STAB. Section	Designed by: R.G.P. Reviewed by: J.I.R.	Checked by: J.I.R. Drawn by: R.G.P.
	MISSOURI RIVER, NEBRASKA / IOWA						

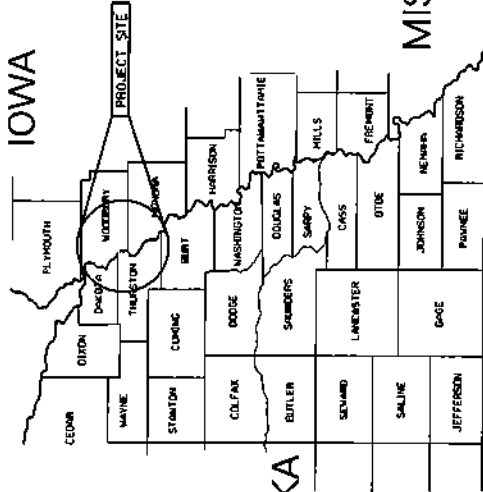
SYMBOL	DESCRIPTIONS	DATE	APPROVED



VICINITY MAP
NOT TO SCALE

PROJECT SITE

SOUTH DAKOTA



LOCATION MAP
NOT TO SCALE

LEGEND

- PILE DIKE
- STONE FILL DIKE OR REVETMENT OR
- PILE DIKE STONE FILL
- PILE REVETMENT
- PILE REVETMENT, STONE FILL
- TOE TRENCH OR STANDARD REVETMENT OR
- REINFORCED STD. REVET. OR ACCRETMENT
- ASPHALT REVETMENT
- DESIGNED STABILIZED CHANNEL LINE
- BLUFF LINE
- 1960 CHANNEL MILEAGE
- BEND CHANGE

569
580.3
615.8
CRP

STRUCTURE NUMBERS ARE BASED ON 1890 MILEAGE

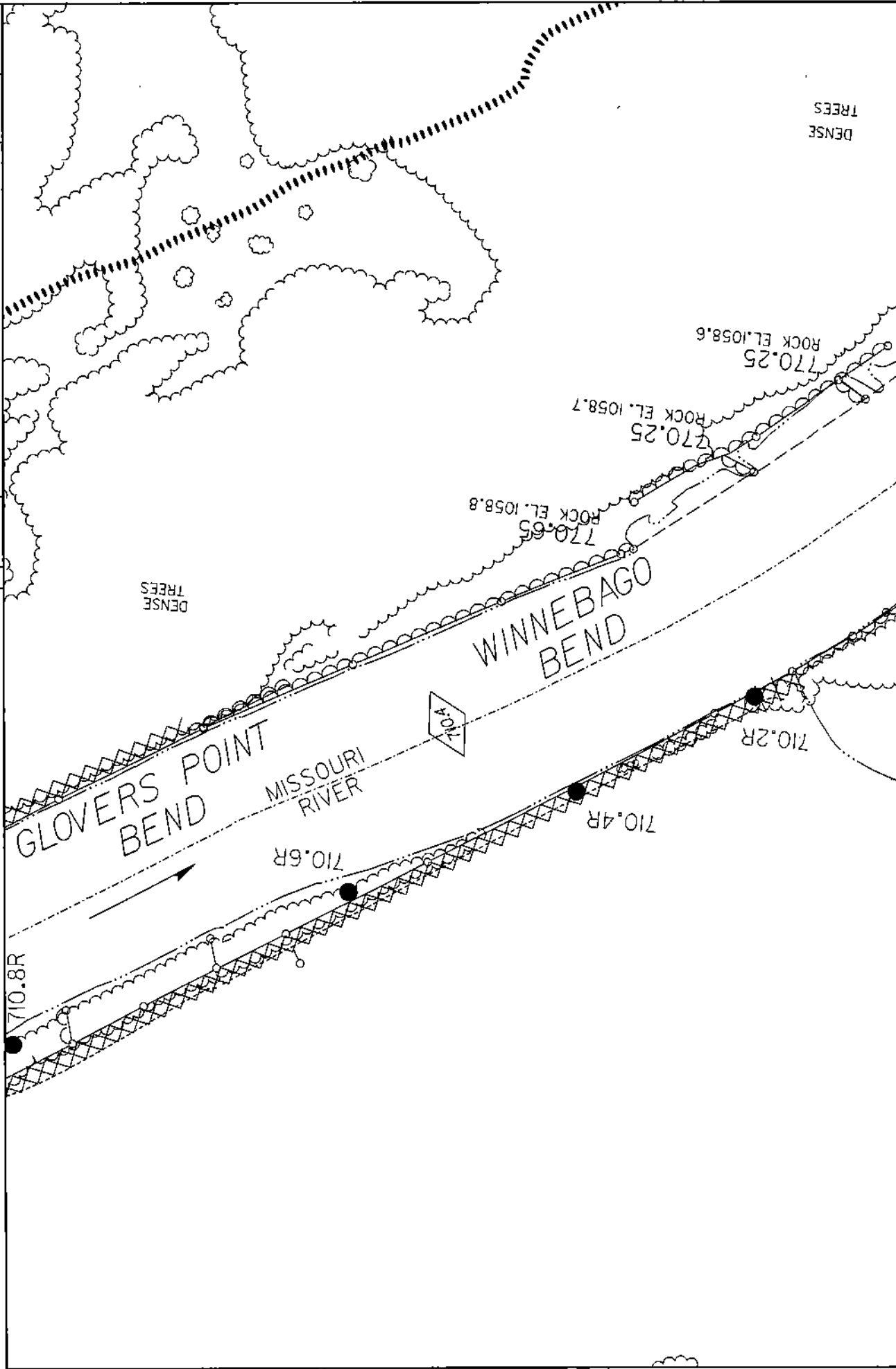
THIS IS THE CONSTRUCTION REFERENCE PLANE WHICH REPRESENTS A SYNTHESIZED WATER SURFACE PROFILE OF A STEADY DISCHARGE THAT IS EQUATED OR EXCEEDED 75% OF THE TIME DURING THE NAVIGATION SEASON (APRIL - NOVEMBER).

Computer File: SHEET0.DGN Date: MAR. 2004 Drawing Code: PLUDDATA\PACKP\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 74.3 TO 716.4 SITE MAP	Submitted by: Designed by: R.G.P. Reviewed by: J.I.R. Chief SED. & CHAN STAB. Section	Checked by: J.I.R. Drawn by: R.G.P.

0M

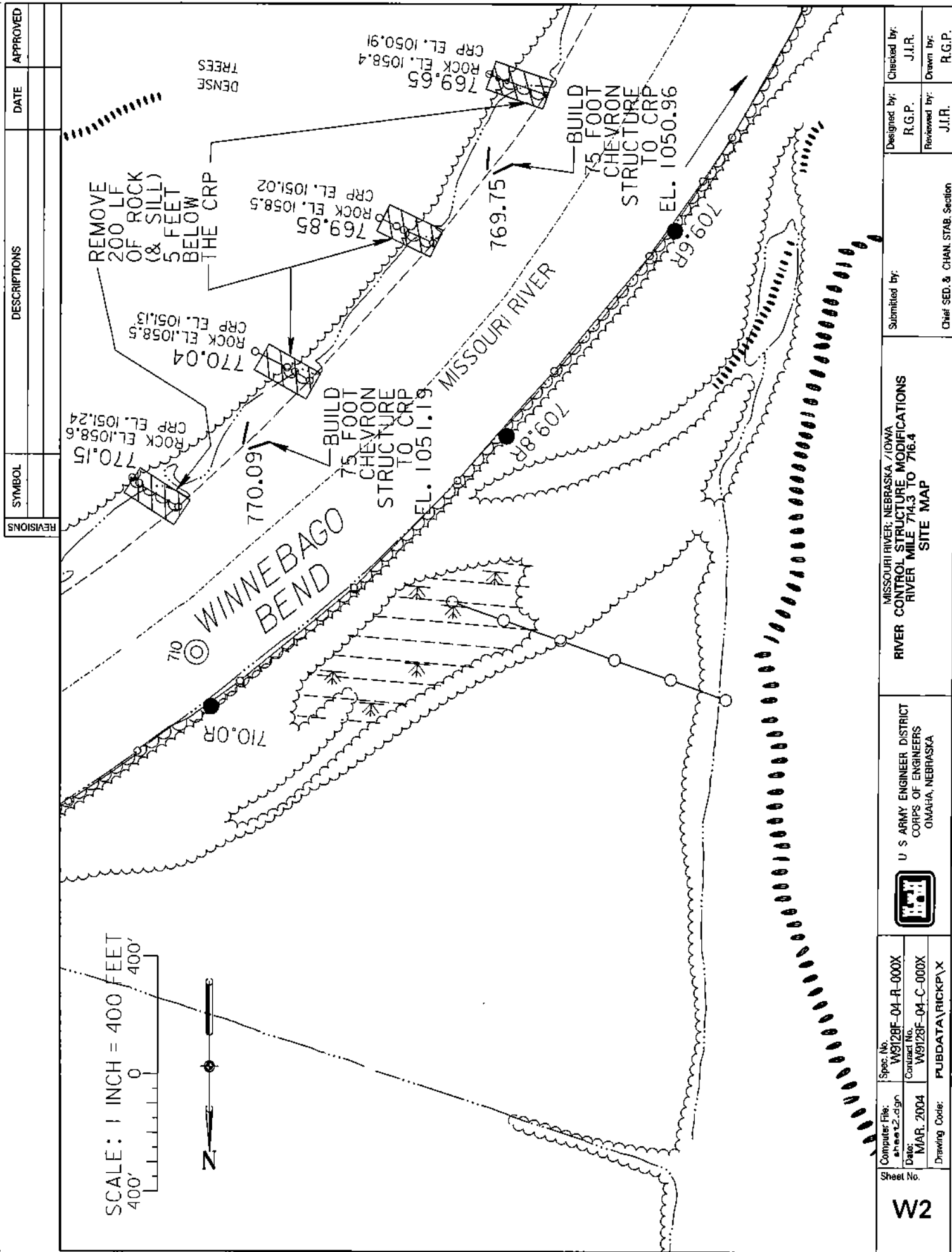
SYMBOL	DESCRIPTIONS	DATE	APPROVED

REVISIONS

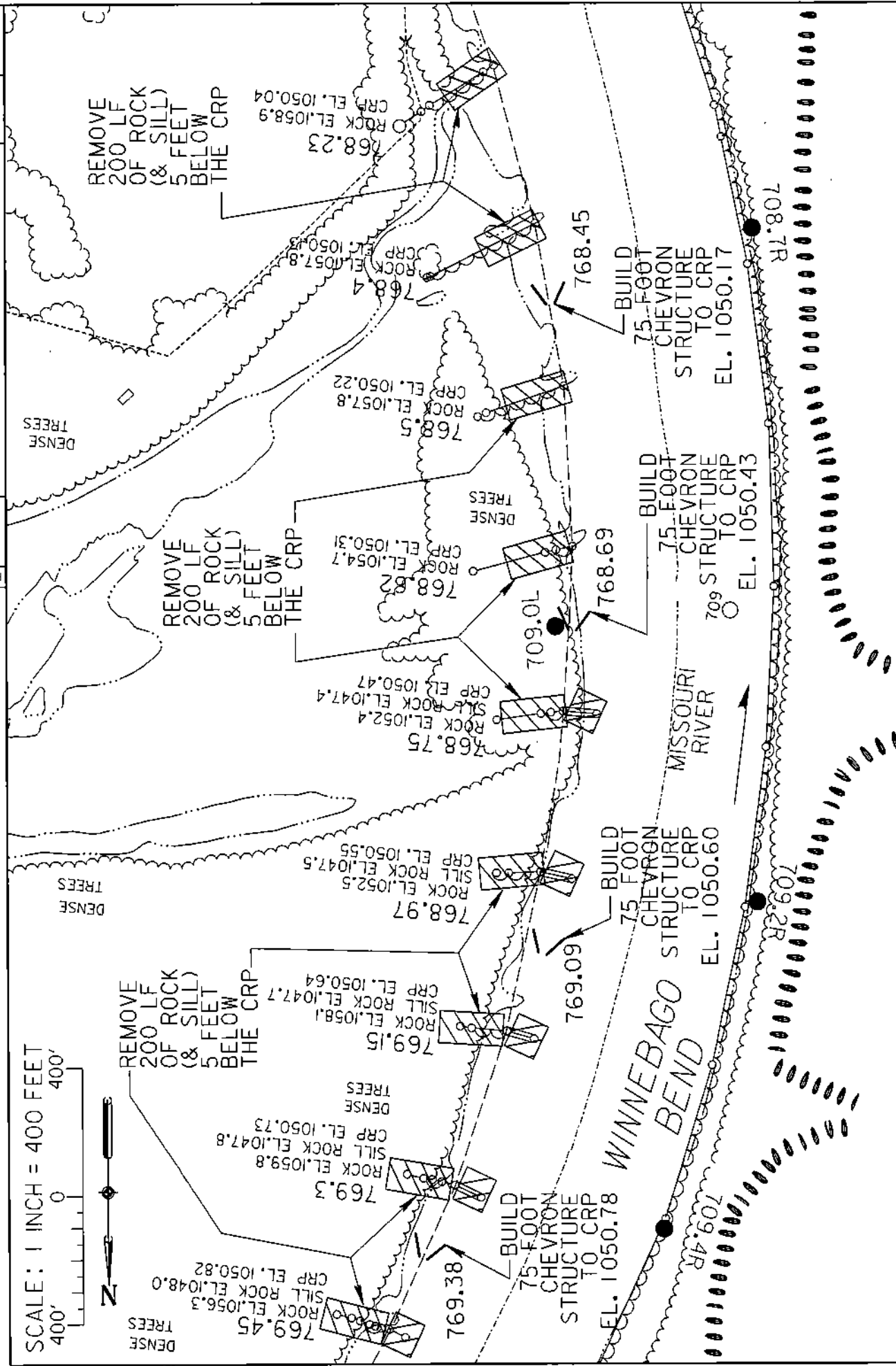


Computer File: sheet1.dgn Date: MAR. 2004 Drawing Code:	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 744.3 TO 716.4 SITE MAP	Submitted by: Chief SED & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
						Reviewed by: J.I.R.	Drawn by: R.G.P.

W1



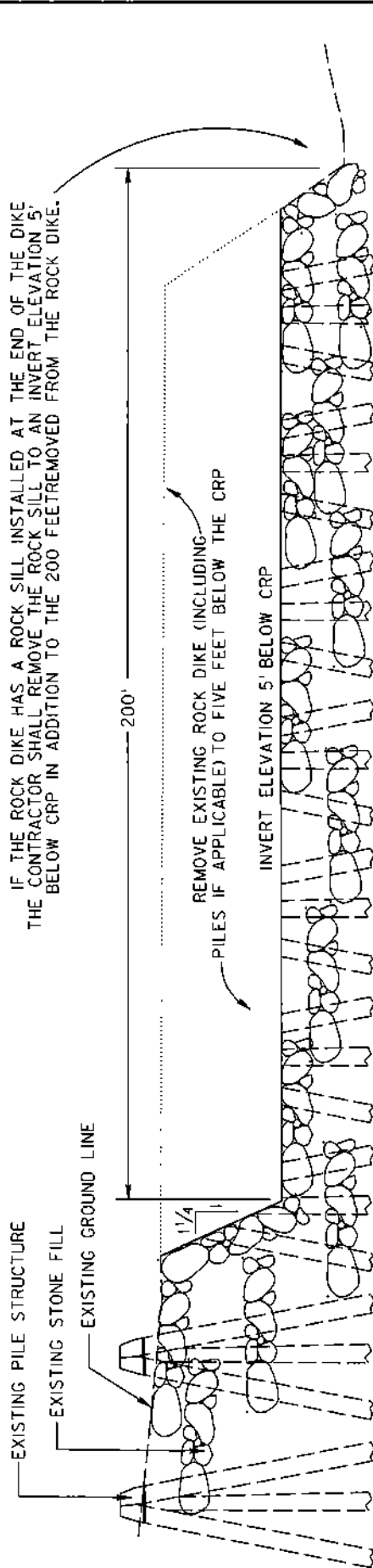
SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			



Computer File: sheet3.dgn Date: MAR. 2004 Drawing Code:	Spec No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 714.3 TO 716.4 SITE MAP	Submitted by: Chief SED & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

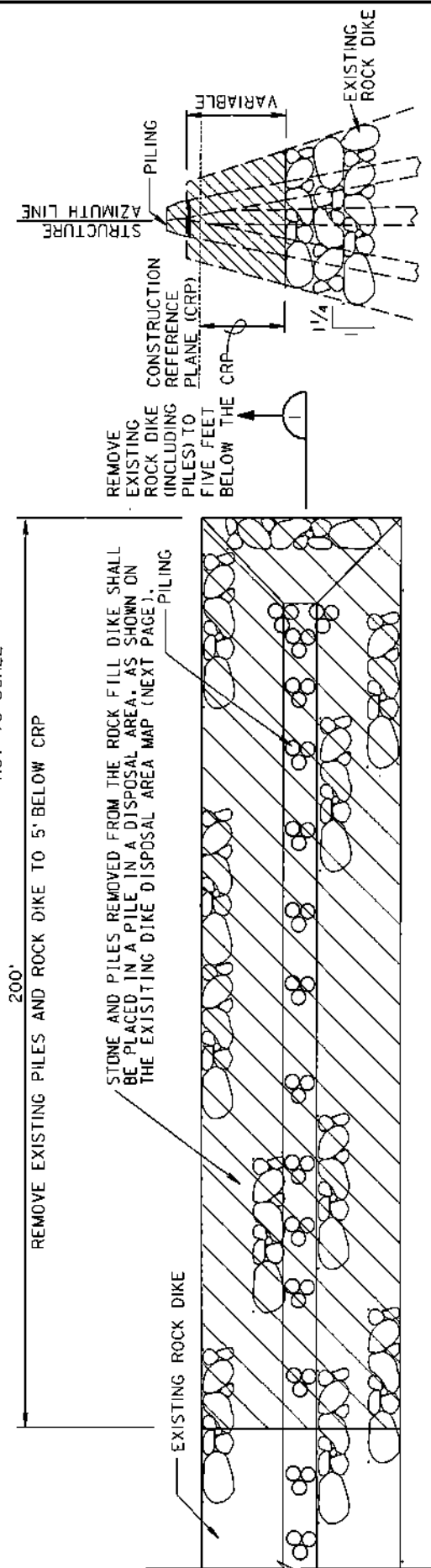
Sheet No.
W3

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



SECTION 1

NOT TO SCALE



DIKE REMOVAL DETAIL

PLAN VIEW

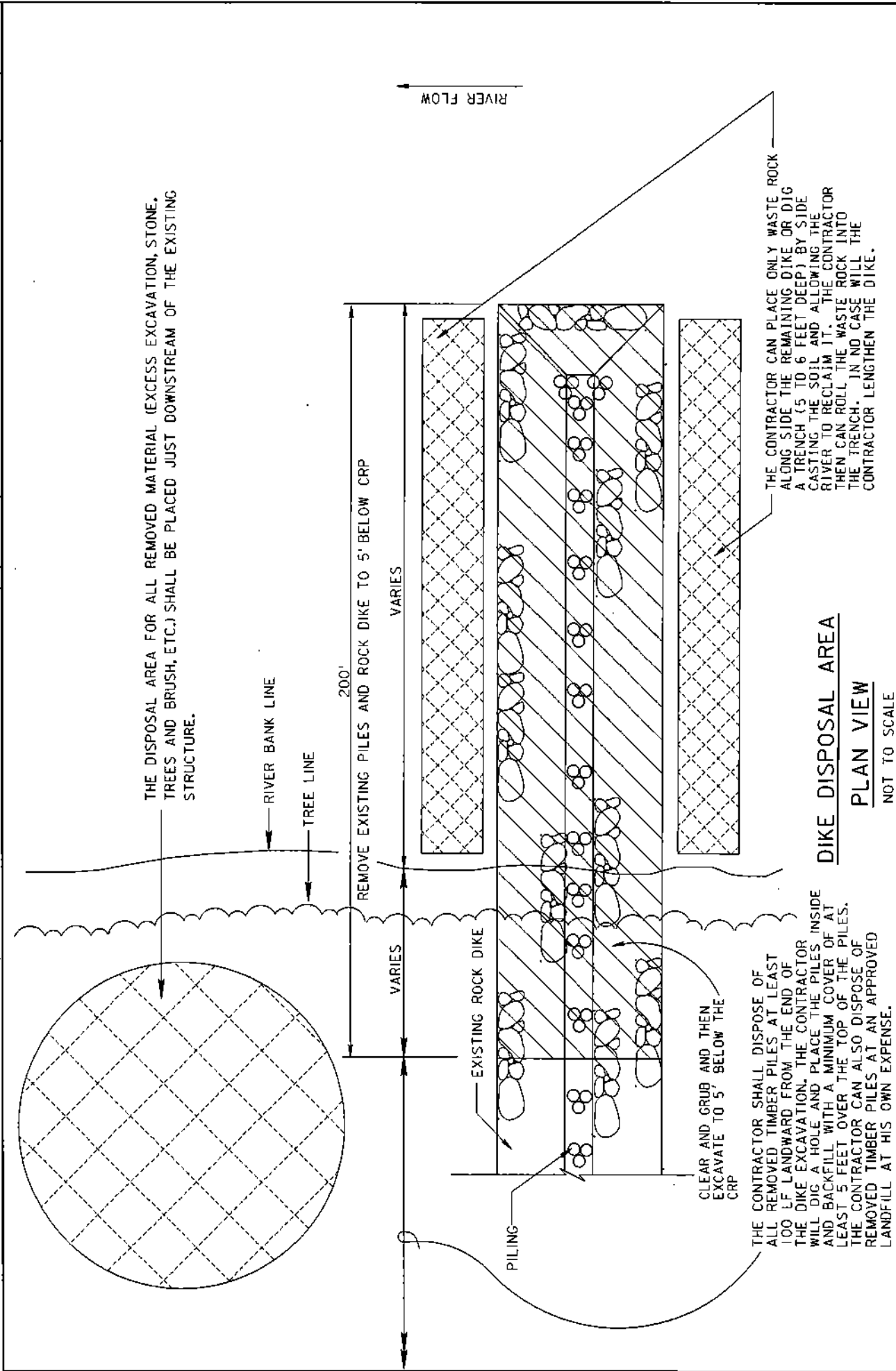
NOT TO SCALE

SECTION 2

NOT TO SCALE

W7 Computer File: SHEET 7.DGN Date: MAR. 2004 Drawing Code: PUBDATA\RICKPYX	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 74.3 TO 76.4 EXISTING DIKE REMOVAL DETAILS	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Computer File: SHEET6.DGN Date: MAR. 2004	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	Missouri River, Nebraska / Iowa River Control Structure Modifications River Mile 714.3 to 716.4 Existing Dike Disposal Area Map	Submitted by: R.G.P.	Designed by: R.G.P.	Checked by: J.I.R.
Sheet No.	Drawing Code: PUBDATA\RICKP\X		Chief SED & CHAN STAB. Section	Reviewed by: J.I.R.	Drawn by: R.G.P.	

W8

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED


BENCH MARK INFORMATION

COORDINATE POINT

POINT	BANK	NORTHING	EASTING	ELEVATION
707.8	R	15345704.93065	732441.64994	1054.31000
708.1	L	15347181.67534	732254.47761	1055.42000
708.3	R	15347494.04108	731155.14368	1058.24000
708.5	L	15348789.68545	731287.34064	1052.74000
708.7	R	15350161.29196	730006.24516	1058.31000
709.0	L	15351387.18302	730639.05187	1058.52000
709.2	R	15352239.11092	729992.41590	1056.77000
709.8	R	15355139.19583	731499.68102	1059.82000
710.0	R	15356053.61211	732507.96653	1061.63000
710.4	R	15356981.93538	734029.45734	1067.02000
710.6	R	15357298.74203	734747.02599	1057.85000
710.8	R	15357761.79454	735780.93781	1071.17000

CONDITION OF MISSOURI RIVER CONTROL POINTS:

1. NO EFFORT HAS BEEN MADE TO MONITOR THESE POINTS. SOME HAVE ERODED INTO THE RIVER WHILE OTHERS MAY BE BURIED UNDER 1-5 FEET OF SEDIMENT.
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4. HORIZONTAL CONTROL: UTM ZONE 15, NAD 83
VERTICAL CONTROL: NGVD 29 (ALSO REFERENCED AS "MEAN SEA LEVEL" DATUM)

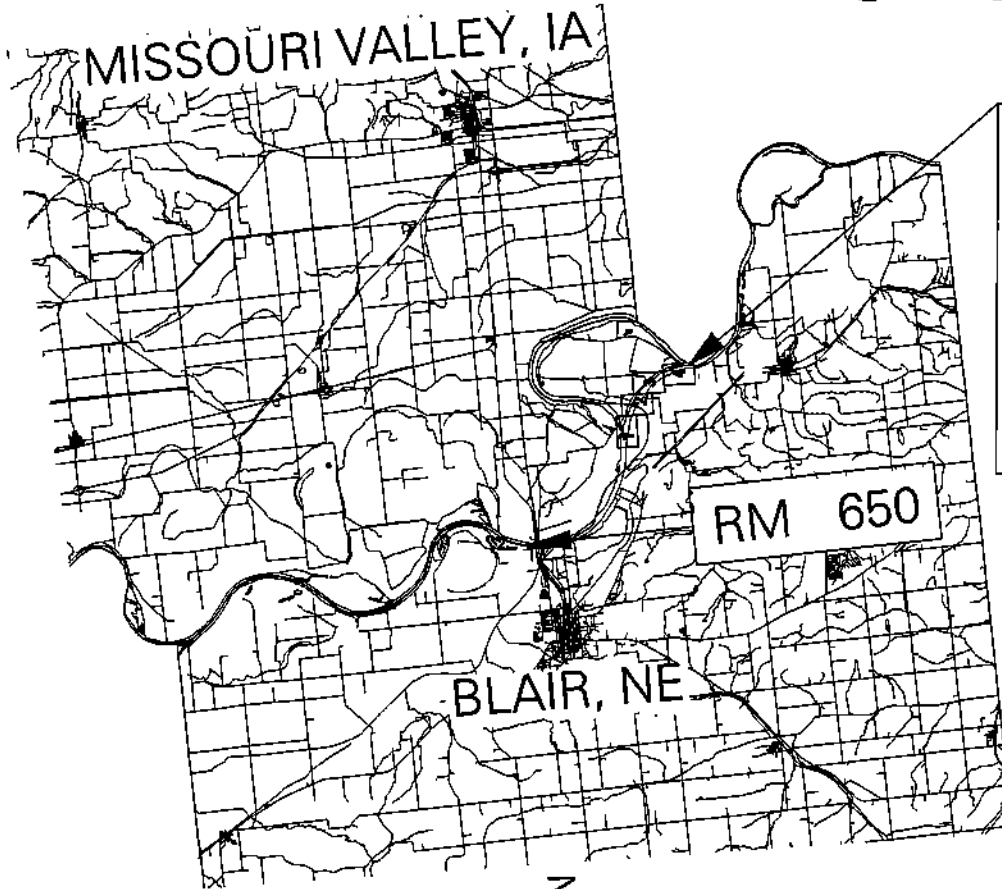
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	Contract No. W9128F-04-C-000X				Reviewed by: J.I.R.	Drawn by: R.G.P.

W9

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

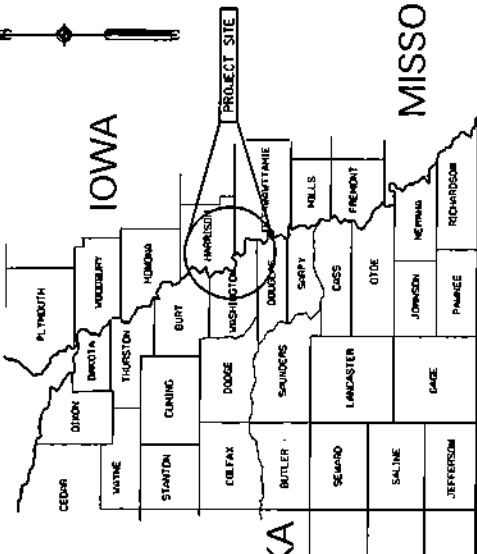
HARRISON
COUNTY

SOUTH DAKOTA



VICINITY MAP
NOT TO SCALE

PROJECT SITE



LOCATION MAP
NOT TO SCALE

LEGEND


- PILE DIKE
- STONE FILL DIKE OR REVETMENT OR PILE DIKE STONE FILL
- PILE REVETMENT
- PILE REVETMENT, STONE FILL
- TOE TRENCH OR STANDARD REVETMENT OR REINFORCED STD. REVET. OR ACCRETMENT
- ASPHALT REVETMENT
- DESIGNED STABILIZED CHANNEL LINE
- BLUFF LINE
- 1960 CHANNEL MILEAGE
- BEND CHANGE

615.8

CRP

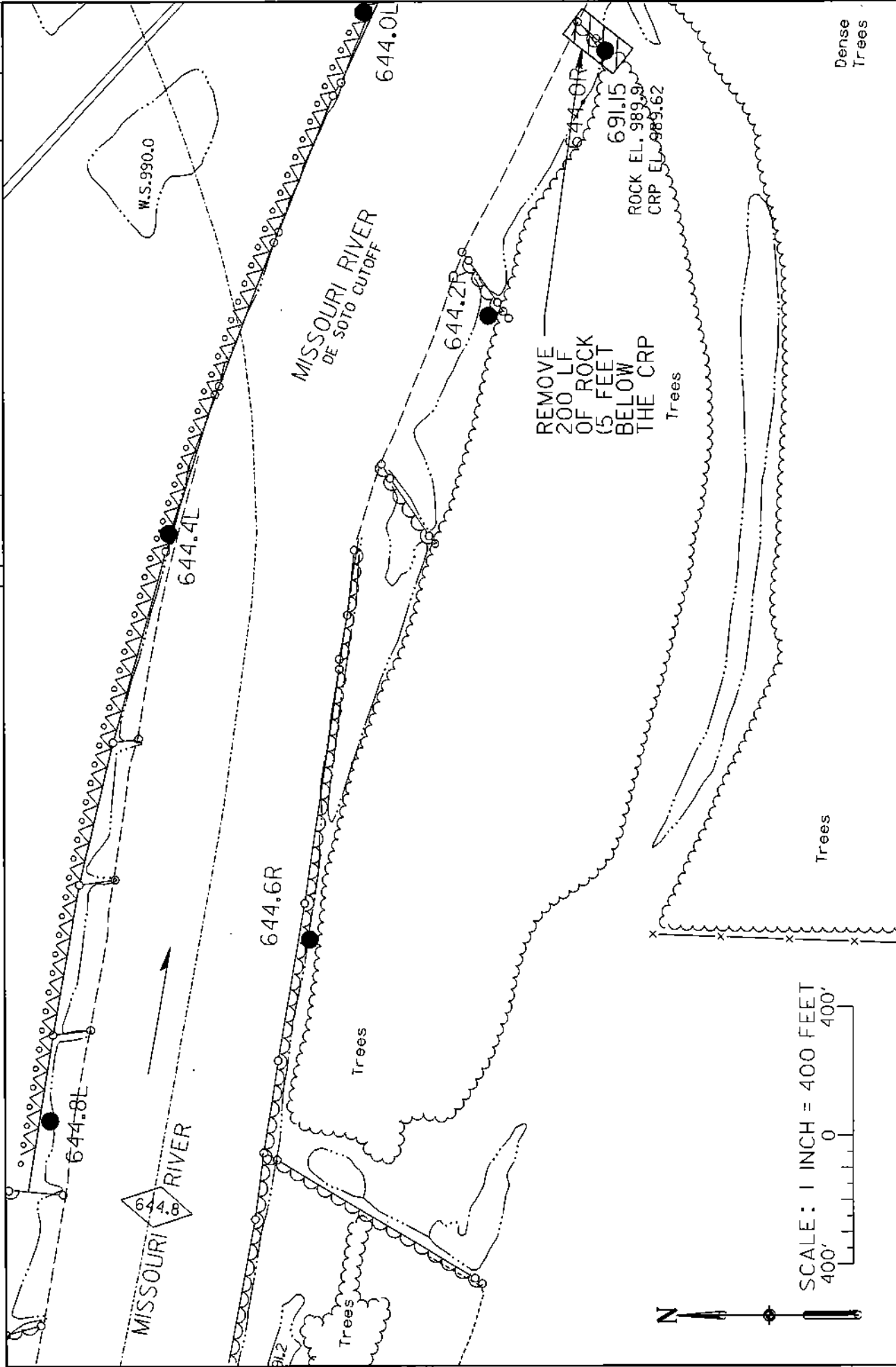
STRUCTURE NUMBERS ARE BASED ON 1890 MILEAGE

THIS IS THE CONSTRUCTION REFERENCE PLANE WHICH REPRESENTS A SYNTHESIZED WATER SURFACE PROFILE OF A STEADY DISCHARGE THAT IS EQUALED OR EXCEEDED 75% OF THE TIME DURING THE NAVIGATION SEASON (APRIL - NOVEMBER).

	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA		MISSOURI RIVER, IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 SITE MAP		Submitted by:		Designed by:	Checked by:	
							R.G.P.	J.I.R.	
					Chief SED. & CHAN. STAB. Section		Reviewed by:	Drawn by:	
							J.I.R.	R.G.P.	
Computer File: SHEET 70.DGN Date: MAR. 2004 Drawing Code:		Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X PUBDATA\RICKP\X		Sheet No.				D0	

D0

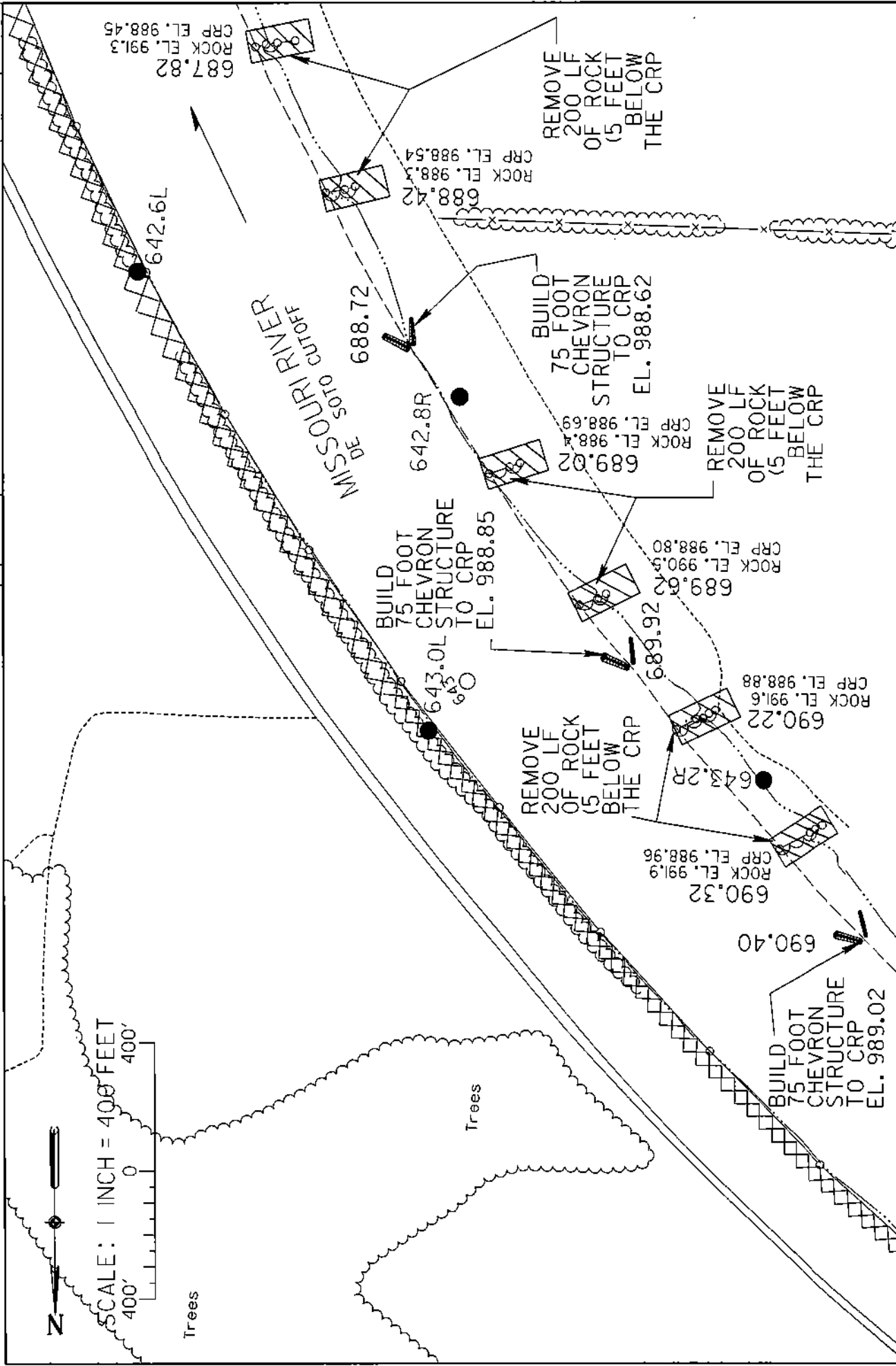
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Computer File: sheet1.dgn Date: MAR 2004 Drawing Code: PUBDATA/RICKP\X	Spec. No: W9128F-04-R-000X Contract No: W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 SITE MAP	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

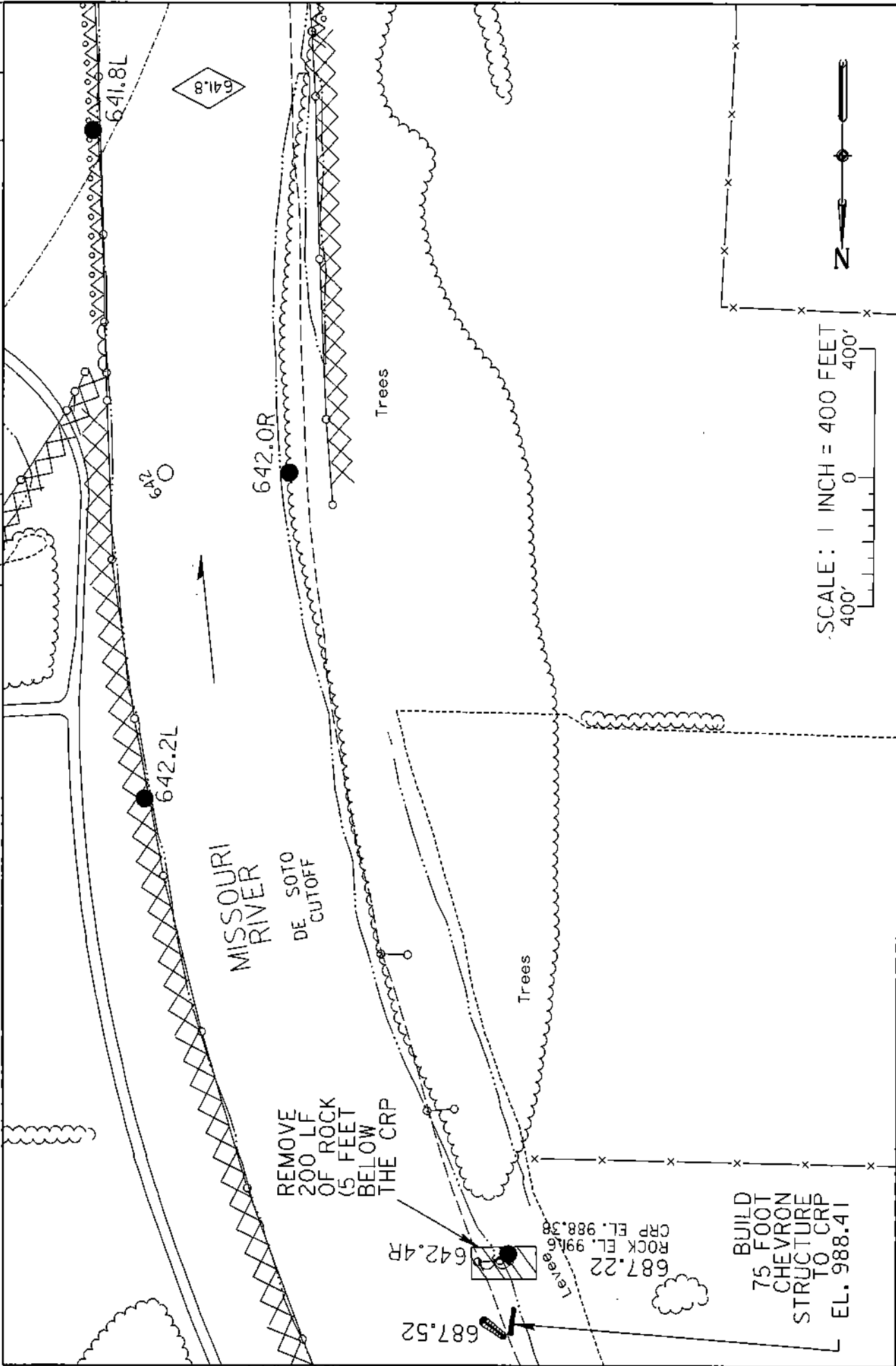
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REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Sheet No. D3	Computer File: sheet3.dgn Date: MAR. 2004 Drawing Code: PUBDATA\RICKP\X		 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 SITE MAP	Submitted by: Chief SED. & CHAN, STAB, Section	Designed by: R.G.P.	Checked by: J.I.R.
						Reviewed by: J.I.R.	Drawn by: R.G.P.

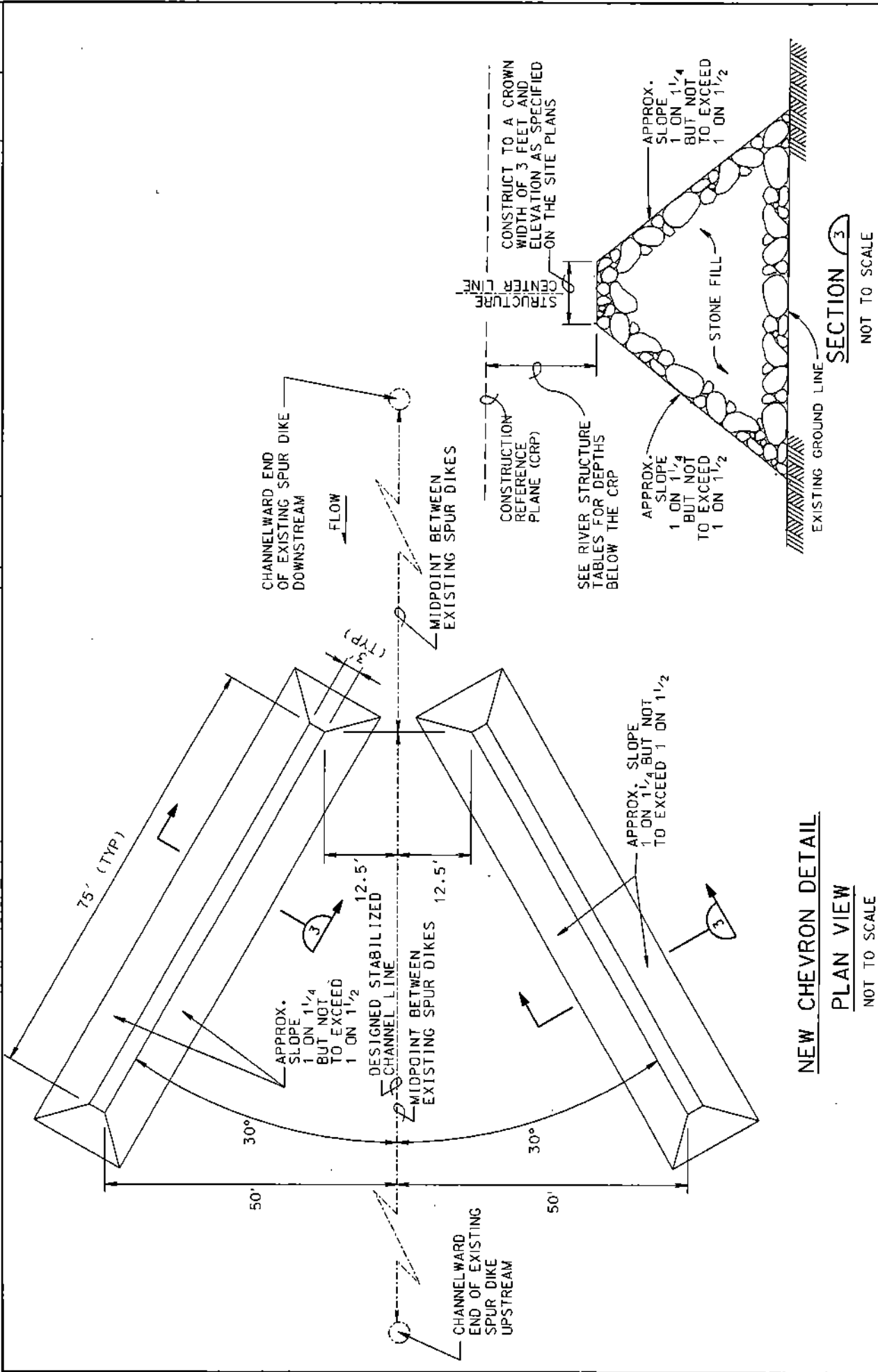
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED




Computer File: sheet4.dgn Date: MAR. 2004 Drawing Code:	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 SITE MAP	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

D4

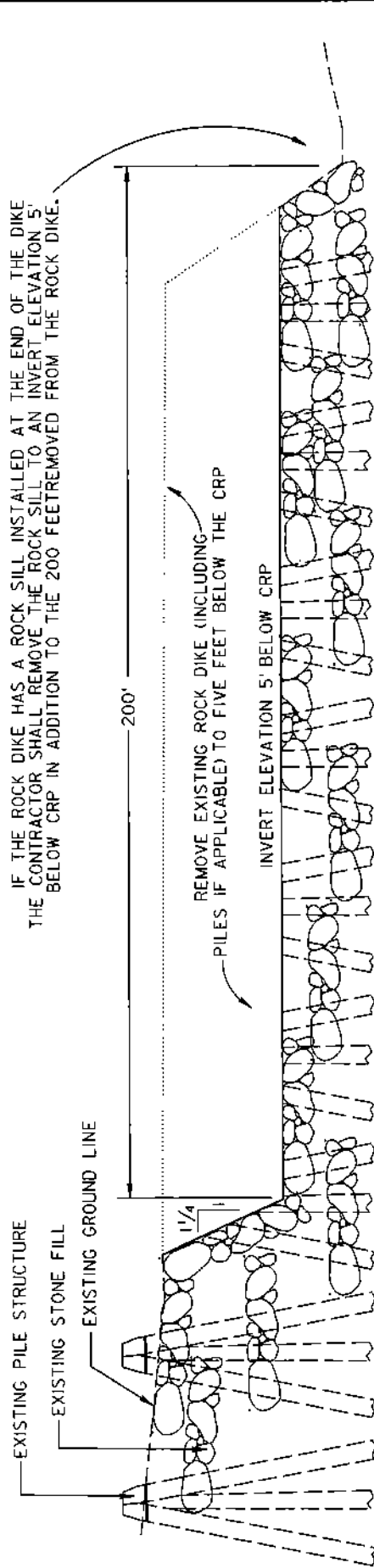
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Sheet No. D6	Computer File: SHEET6.DGN	Spec. No. W9128F-04-R-000X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 CHEVRON STRUCTURE	Submitted by:		Designed by:	Checked by:
	Date: MAR, 2004	Contract No. W9128F-04-C-000X				R.G.P.	J.I.R.	
	Drawing Code: PUBDATA\RICKP\X					Reviewed by:	Drawn by:	
						J.I.R.	R.G.P.	
			Chief SED. & CHAN STAB Section					

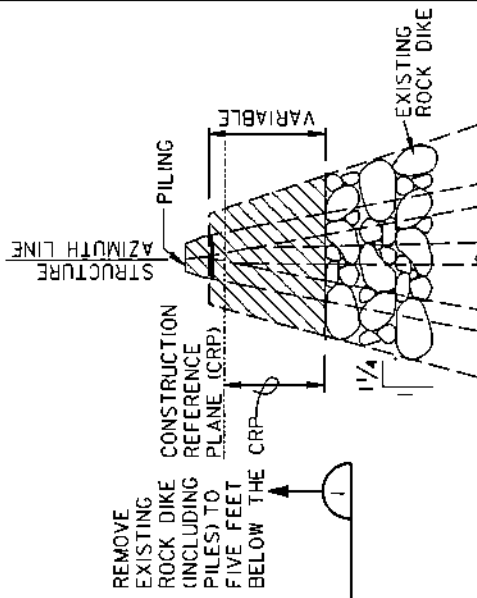
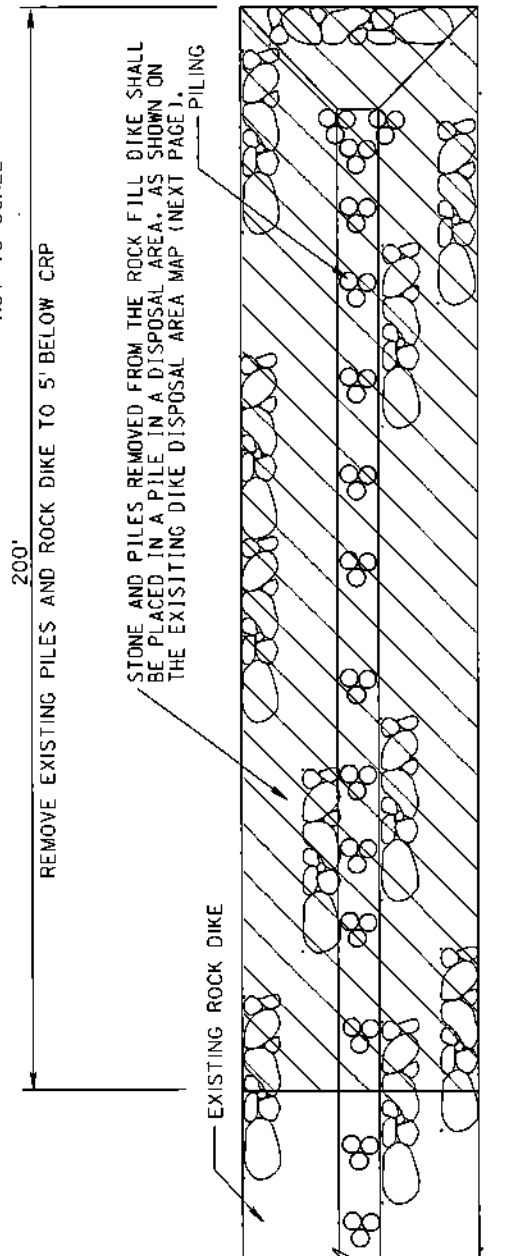
SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			

IF THE ROCK DIKE HAS A ROCK SILL INSTALLED AT THE END OF THE DIKE THE CONTRACTOR SHALL REMOVE THE ROCK SILL TO AN INVERT ELEVATION 5' BELOW CRP IN ADDITION TO THE 200 FEET REMOVED FROM THE ROCK DIKE.



SECTION 1

NOT TO SCALE



SECTION 2

NOT TO SCALE

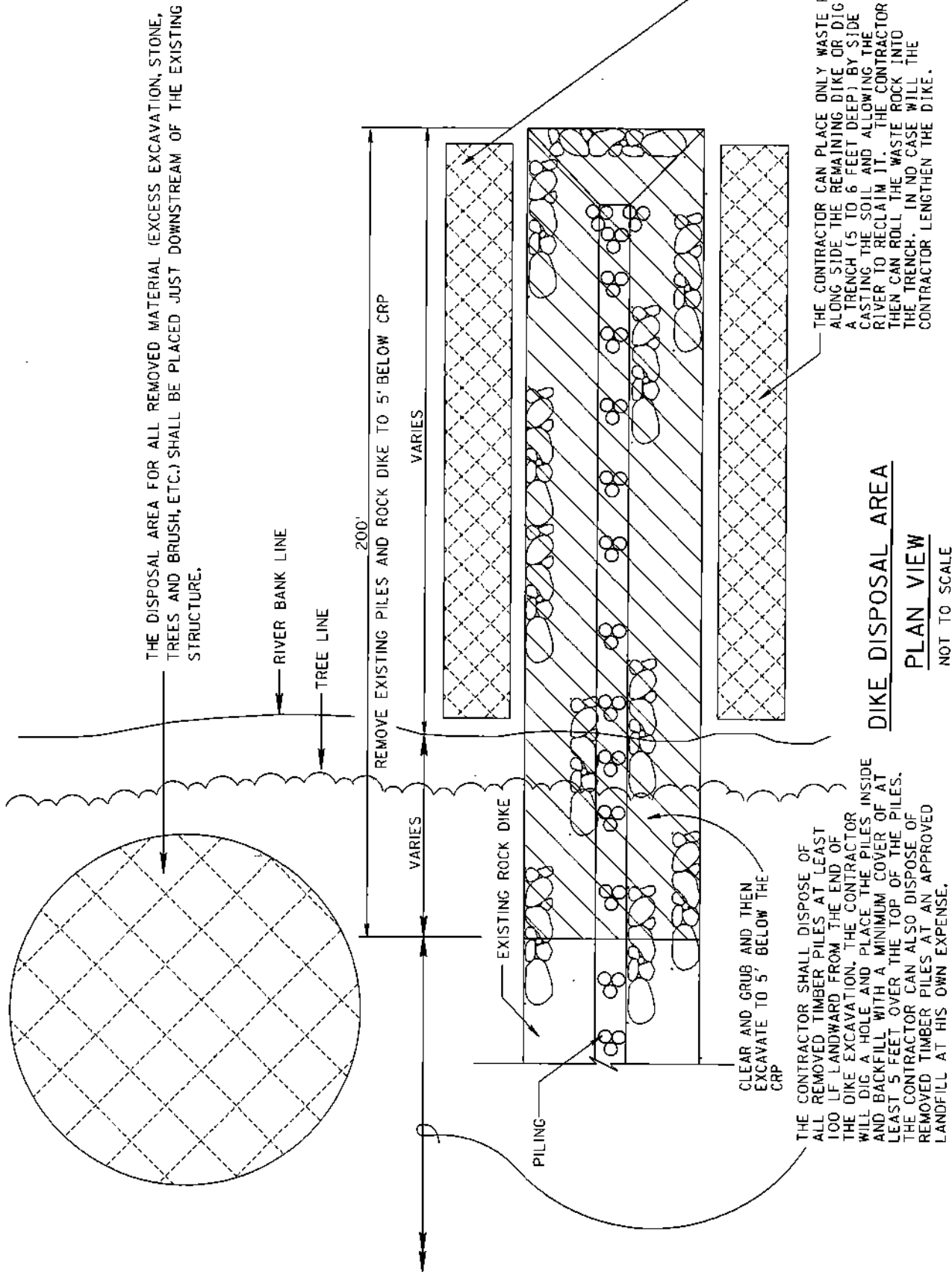
DIKE REMOVAL DETAIL

PLAN VIEW

NOT TO SCALE

Computer File: SHEET7.DGN Date: MAR 2004 Drawing Code:	Spec No: W9128F-04-R-000X Contract No: W9128F-04-C-000X PUBDATA/RICKP/VX	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 EXISTING DIKE REMOVAL DETAILS	Submitted by: Chief SED & CHAN, STAB, Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			



Computer File: W9128F-04-R-000X SHEET 16.DGN Date: MAR, 2004 Drawing Code: PUBDATA\RICKP\X		Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA		MISSOURI RIVER: IOWA / NEBRASKA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 EXISTING DIKE DISPOSAL AREA MAP		Submitted by: Chief SED & CHAN, STAB, Section		Designed by: R.G.P. Reviewed by: J.I.R. Checked by: J.I.R. Drawn by: R.G.P.	
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D8


REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

BENCH MARK INFORMATION

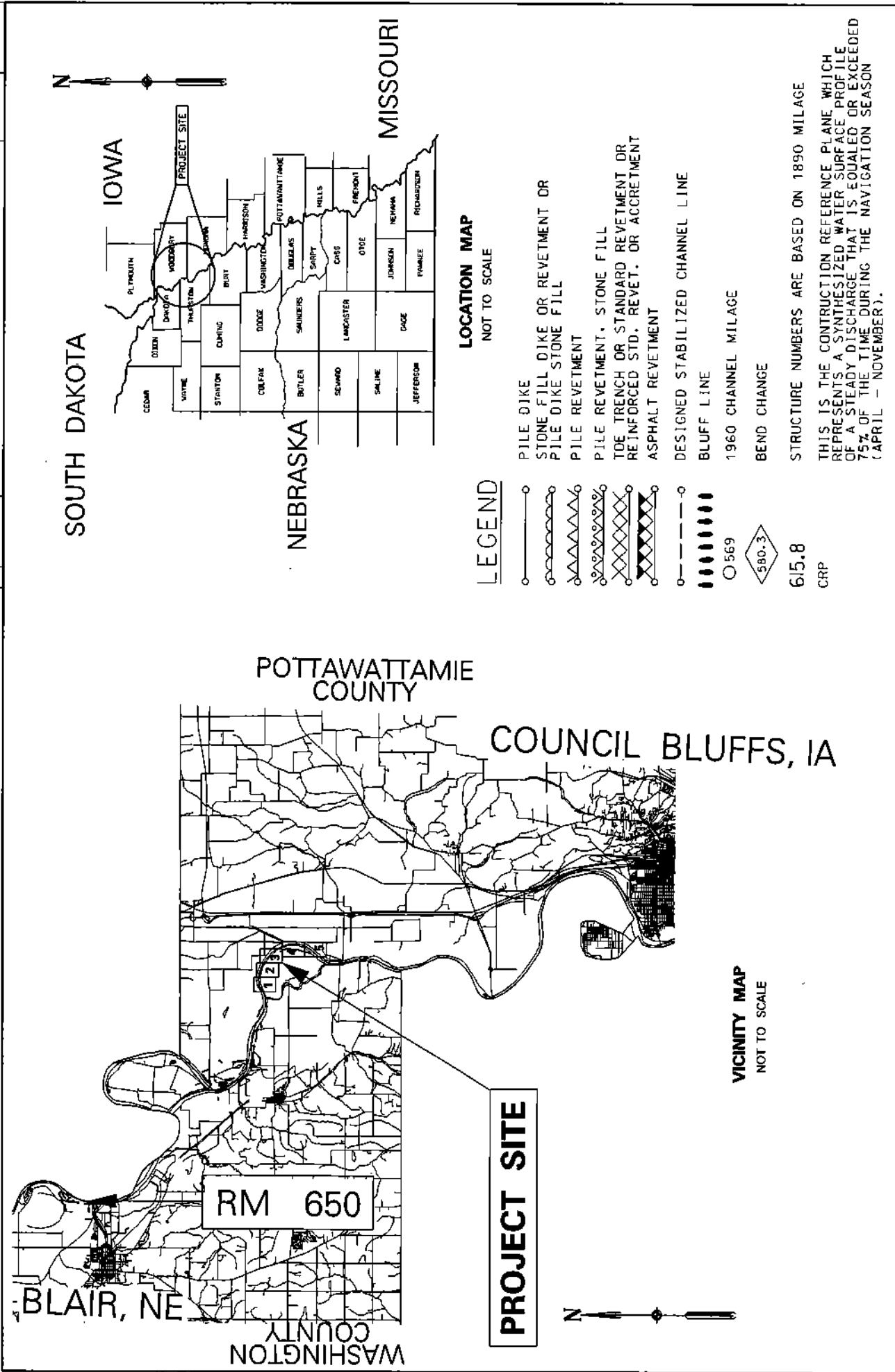
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POINT	BANK	NORTHING	EASTING	
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642.4	R	15087166.71863	812424.19627	1003.20000
642.6	L	15088357.75736	812700.01276	1000.87000
642.8	R	15088753.27916	811695.47563	1005.43000
643.0	L	15089792.78098	811807.02925	1003.08000
643.2	R	15089945.32638	810747.15859	994.11000
643.4	L	15091450.30321	810251.07979	997.69000
643.6	R	15091601.77059	808910.61482	1005.74000
643.8	L	15092746.42518	808465.19284	1000.10000
644.0	L	15093248.82073	807488.19022	994.87000
644.0	R	15092496.56064	807361.31851	1002.49000
644.2	R	15092876.68757	806539.54204	994.67000
644.4	L	15093878.75420	805877.67468	995.55000
644.6	R	15093442.28987	804615.97566	995.62000
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CONDITION OF MISSOURI RIVER CONTROL POINTS:

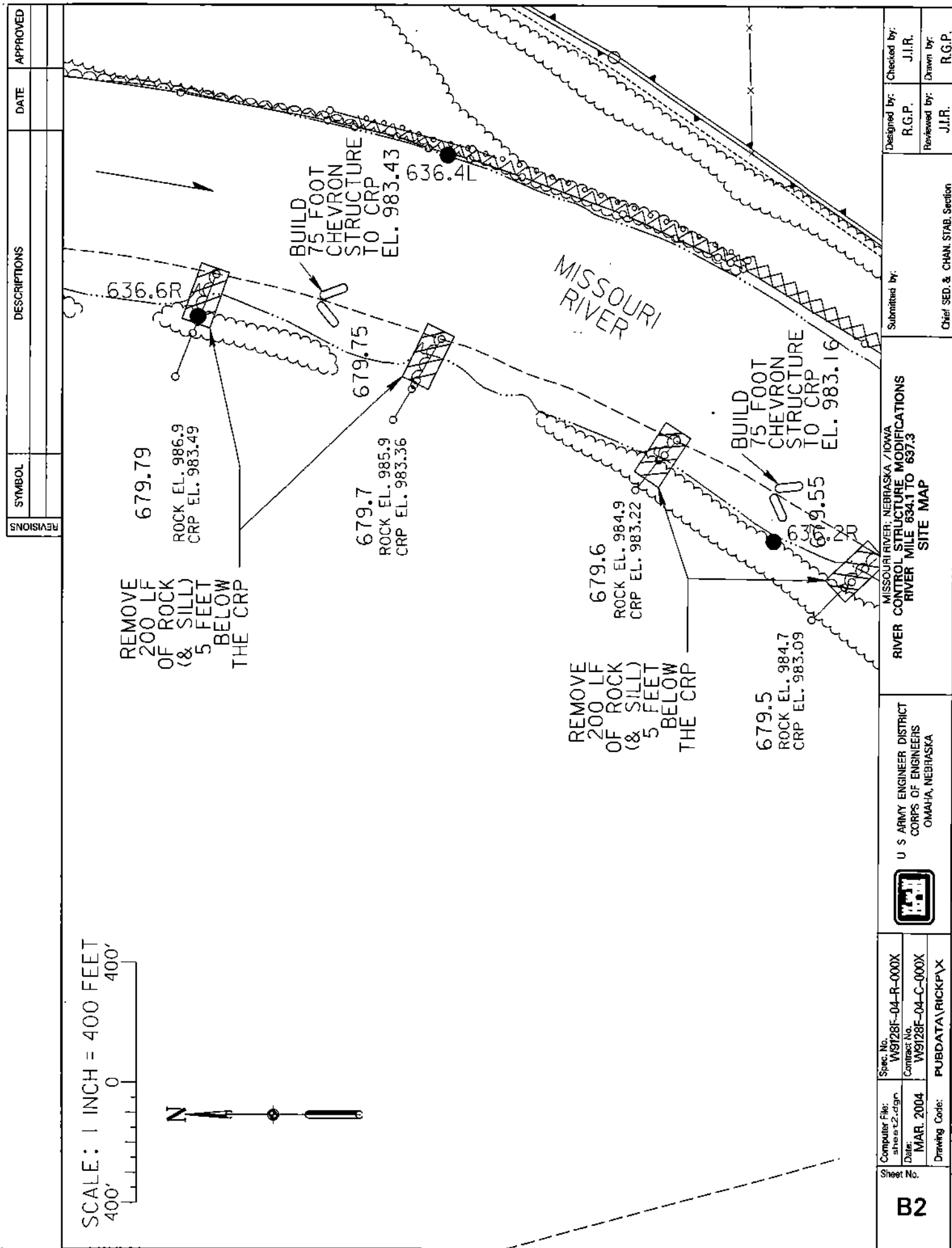
1. NO EFFORT HAS BEEN MADE TO MONITOR THESE POINTS. SOME HAVE ERODED INTO THE RIVER WHILE OTHERS MAY BE BURIED UNDER 1-5 FEET OF SEDIMENT.
2. EACH CONTROL POINT IS A 3-1/4 INCH DIAMETER CORPS OF ENGINEERS BRASS CAP. THEY ARE STAMPED WITH THE RIVER MILE AND LEFT/RIGHT BANK.
3. THE CONTROL POINTS ARE MARKED WITH ORANGE FIBERGLASS WITNESS POSTS (CARSONITE BRAND). THE POSTS WERE TYPICALLY SET 3-8 INCHES LANDWARD OF THE BRASS CAP.
4. HORIZONTAL CONTROL: UTM ZONE 15, NAD 83
VERTICAL CONTROL: NGVD 29 (ALSO REFERENCED AS "MEAN SEA LEVEL" DATUM)

Sheet No. D9	Computer File: W9128F-04-R-000X	Spec No. W9128F-04-R-000X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 642 TO 644 BENCHMARK INFORMATION	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
	Date: MAR. 2004	Contract No. W9128F-04-C-000X				Reviewed by: J.I.R.	Drawn by: R.G.P.

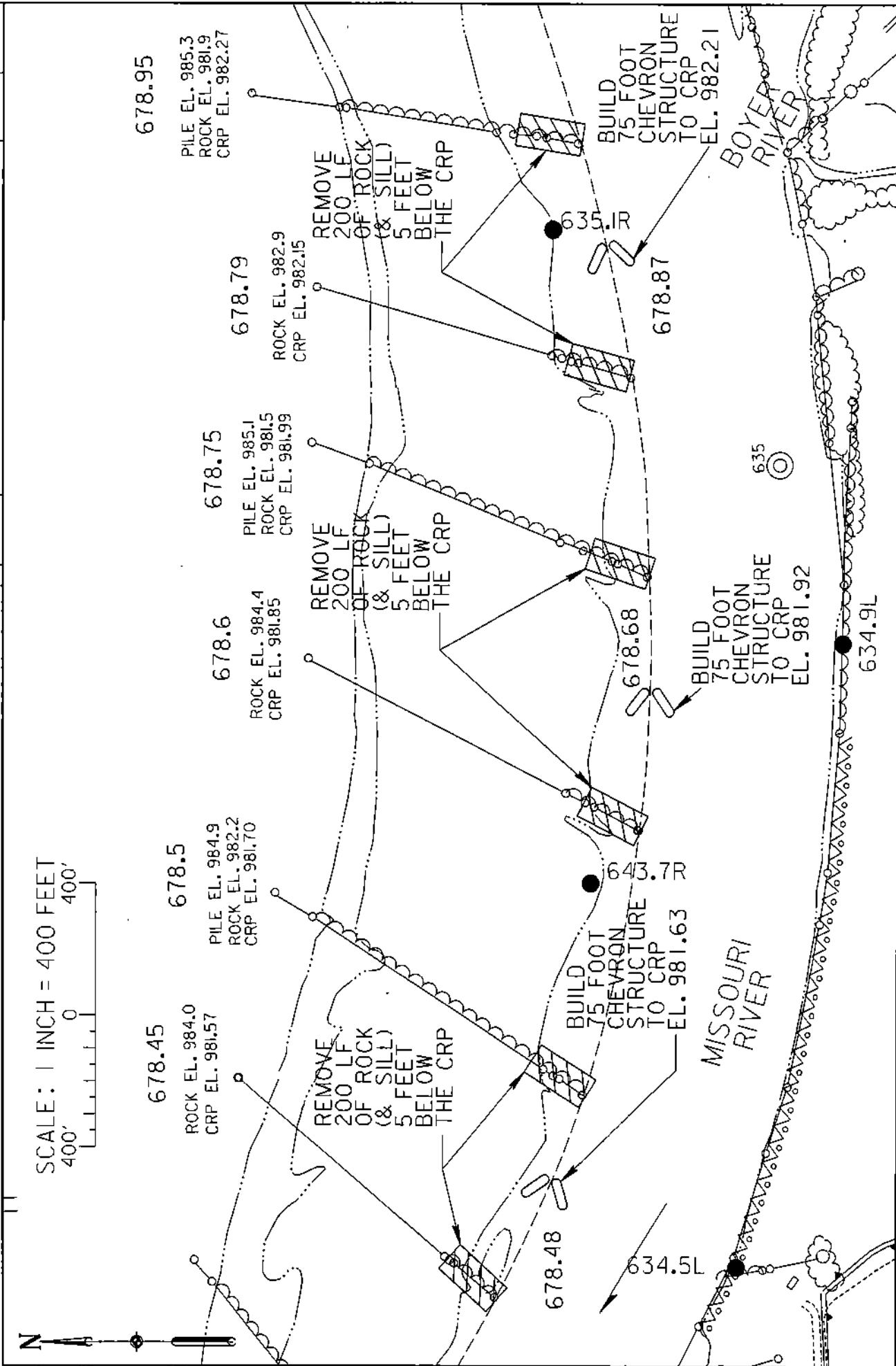
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Computer File: SHEET.DGN	Spec. No. W9128F-04-R-000X	Contract No. W9128F-04-C-000X	PubData\PICKP\X	Sheet No. B0
Date: MAR. 2004	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 634.1 TO 637.3 SITE MAP	Submitted by: R.G.P.	Designed by: J.I.R.
Drawing Code:	Chief SED & CHAN, STAB, Section	Reviewed by: J.I.R.	Drawn by: R.G.P.	



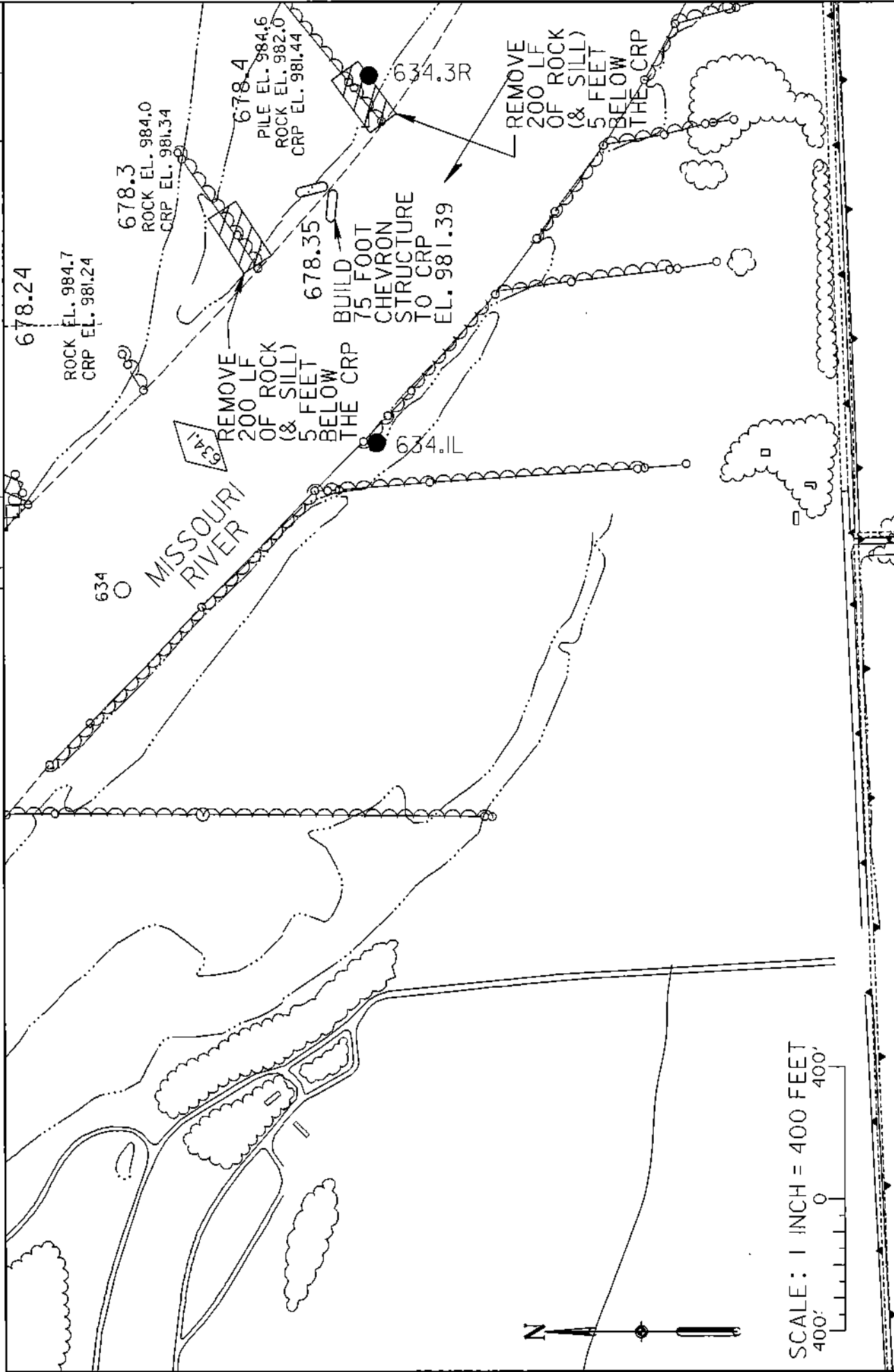
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Computer File: sheet4.dgn Date: MAR. 2004 Drawing Code: PUBDATA\RICK\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 634.1 TO 637.3 SITE MAP	Submitted by: Chief SED & CHAN STAB, Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

B4

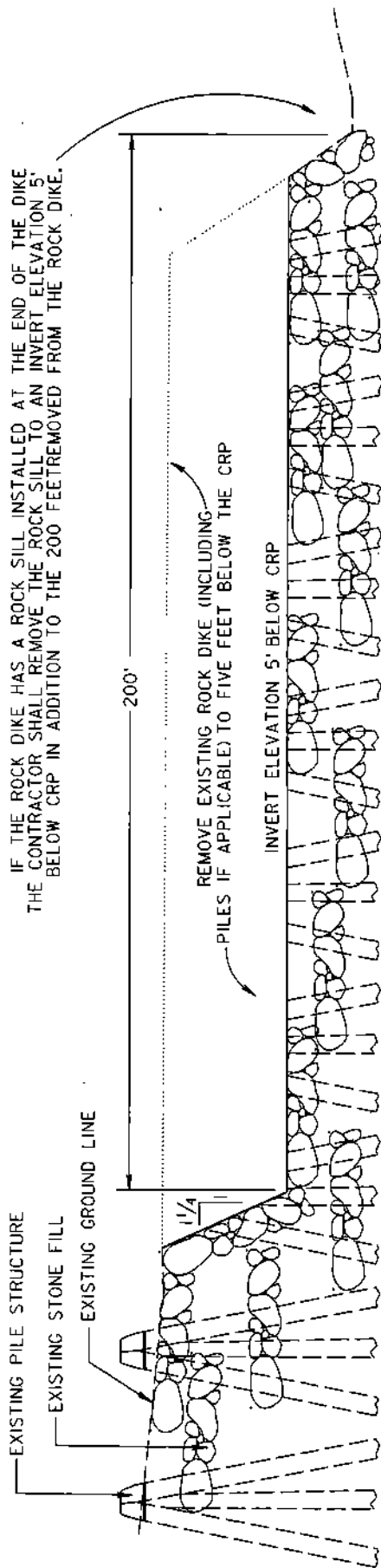
SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			



B5	Sheet No.	Computer File: sheet5.dgn		Spec. No. W9128F-04-R-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 634.1 TO 637.3 SITE MAP	Submitted by:		
	Date: MAR, 2004	Contract No. W9128F-04-C-000X	Designed by: R.G.P.					Checked by: J.I.R.		
	Drawing Code: PUBDATA\RICKPVX	Drawn by: R.G.P.								
Chief SED. & CHAN, STAB, Section										

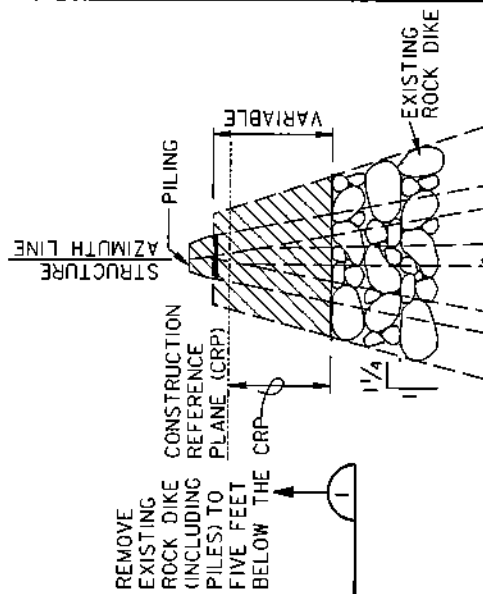
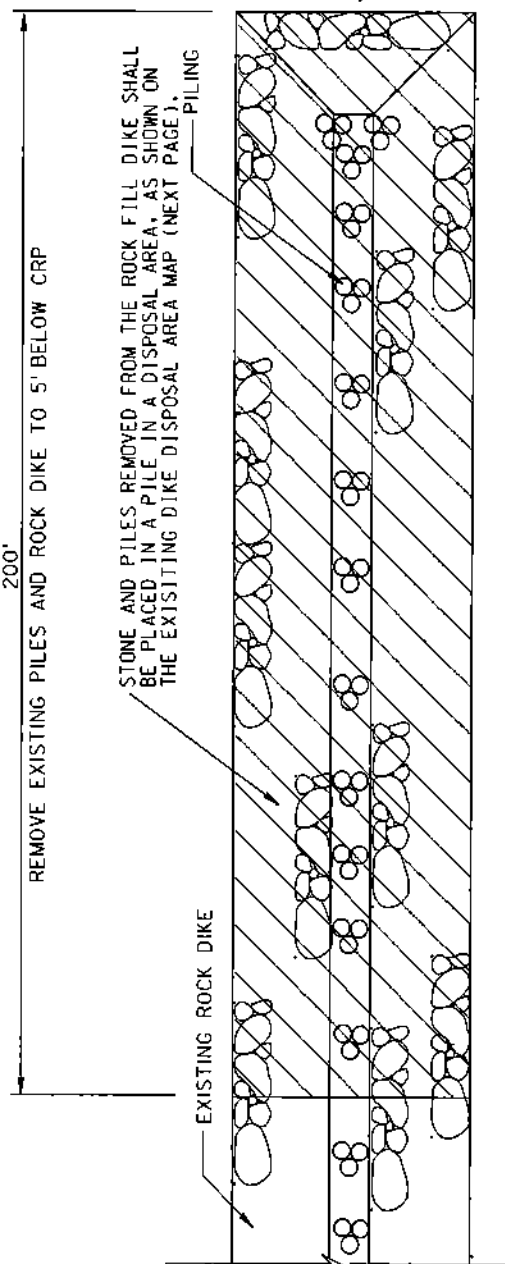
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

IF THE ROCK DIKE HAS A ROCK SILL INSTALLED AT THE END OF THE DIKE THE CONTRACTOR SHALL REMOVE THE ROCK SILL TO AN INVERT ELEVATION 5' BELOW CRP IN ADDITION TO THE 200 FEET REMOVED FROM THE ROCK DIKE.



SECTION 1

NOT TO SCALE



DIKE REMOVAL DETAIL

PLAN VIEW

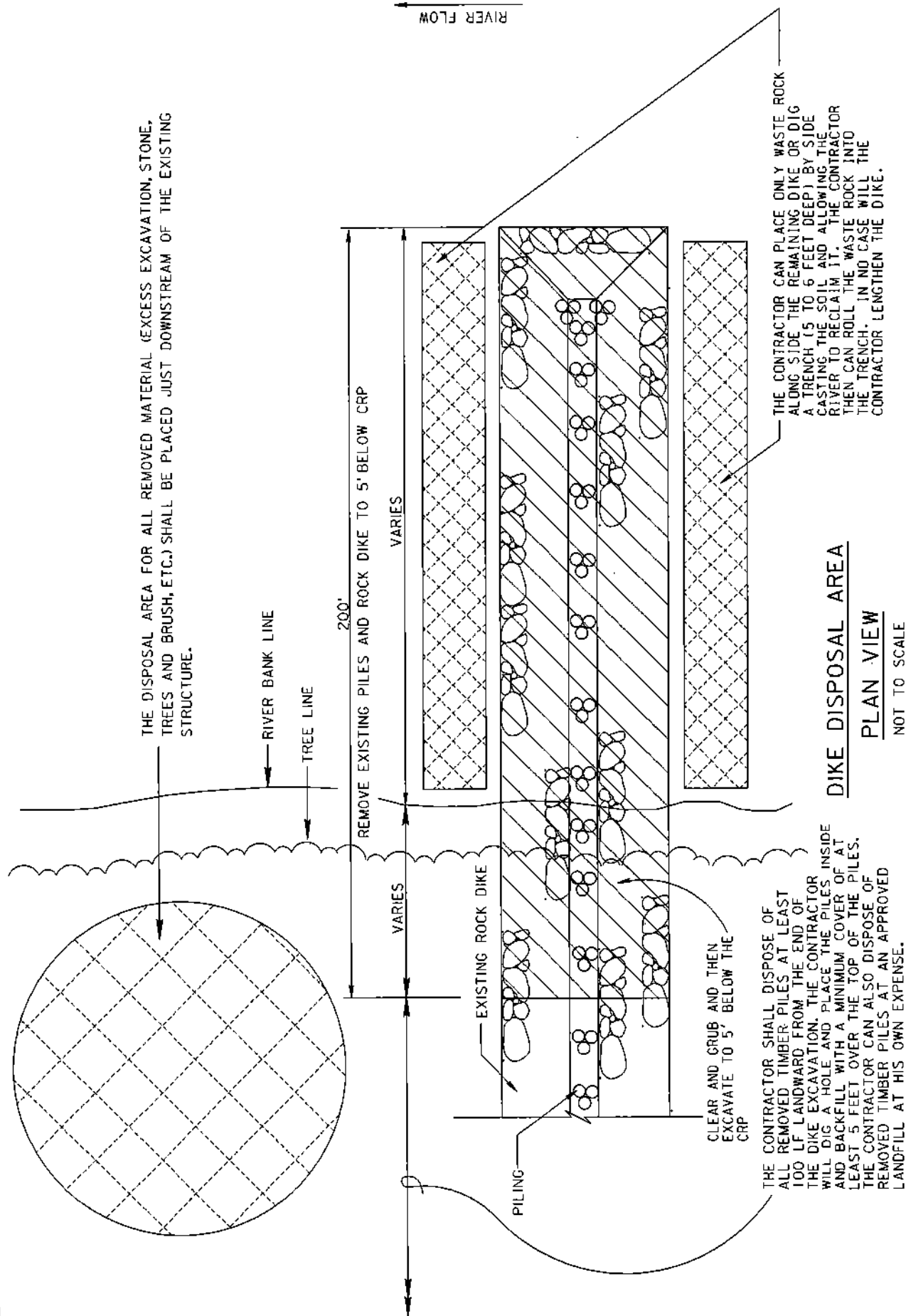
NOT TO SCALE

SECTION 2

NOT TO SCALE

Computer File: SHEET 78-DGN Date: MAR. 2004 Drawing Code: PUBDATA\RICKP\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER; NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 634.1 TO 637.3 EXISTING DIKE REMOVAL DETAILS	Submitted by: Chief SED & CHAN STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

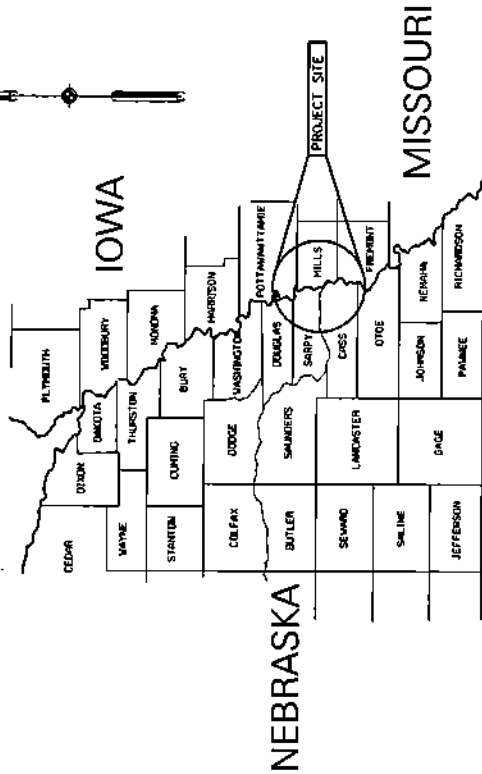
SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			



Computer File: W9128F-04-R-000X	Spec. No. W9128F-04-R-000X	Submitted by: Chief SED. & CHAN, STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
Date: MAR. 2004	Contract No. W9128F-04-C-000X		Reviewed by: J.I.R.	Drawn by: R.G.P.
Sheet No. B9	Drawing Code: PUBDATA\RICKPVX			

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

SOUTH DAKOTA



LOCATION MAP
NOT TO SCALE

LEGEND

- PILE DIKE
- STONE FILL DIKE OR REVETMENT OR
- PILE DIKE STONE FILL
- PILE REVETMENT
- PILE REVETMENT, STONE FILL
- TOE TRENCH OR STANDARD REVETMENT OR
- REINFORCED STD. REVET. OR ACCRETMENT
- ASPHALT REVETMENT
- DESIGNED STABILIZED CHANNEL LINE
- BLUFF LINE
- 1960 CHANNEL MILEAGE
- BEND CHANGE

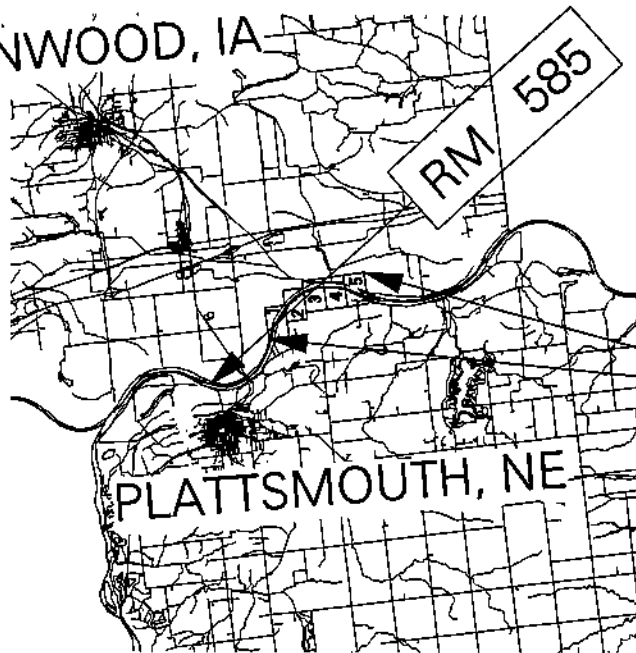
STRUCTURE NUMBERS ARE BASED ON 1890 MILEAGE

CRP

THIS IS THE CONSTRUCTION REFERENCE PLANE WHICH REPRESENTS A SYNTHESIZED WATER SURFACE PROFILE OF A STEADY DISCHARGE THAT IS EQUALED OR EXCEEDED 75% OF THE TIME DURING THE NAVIGATION SEASON (APRIL - NOVEMBER).

GLENWOOD, IA

MILLS COUNTY

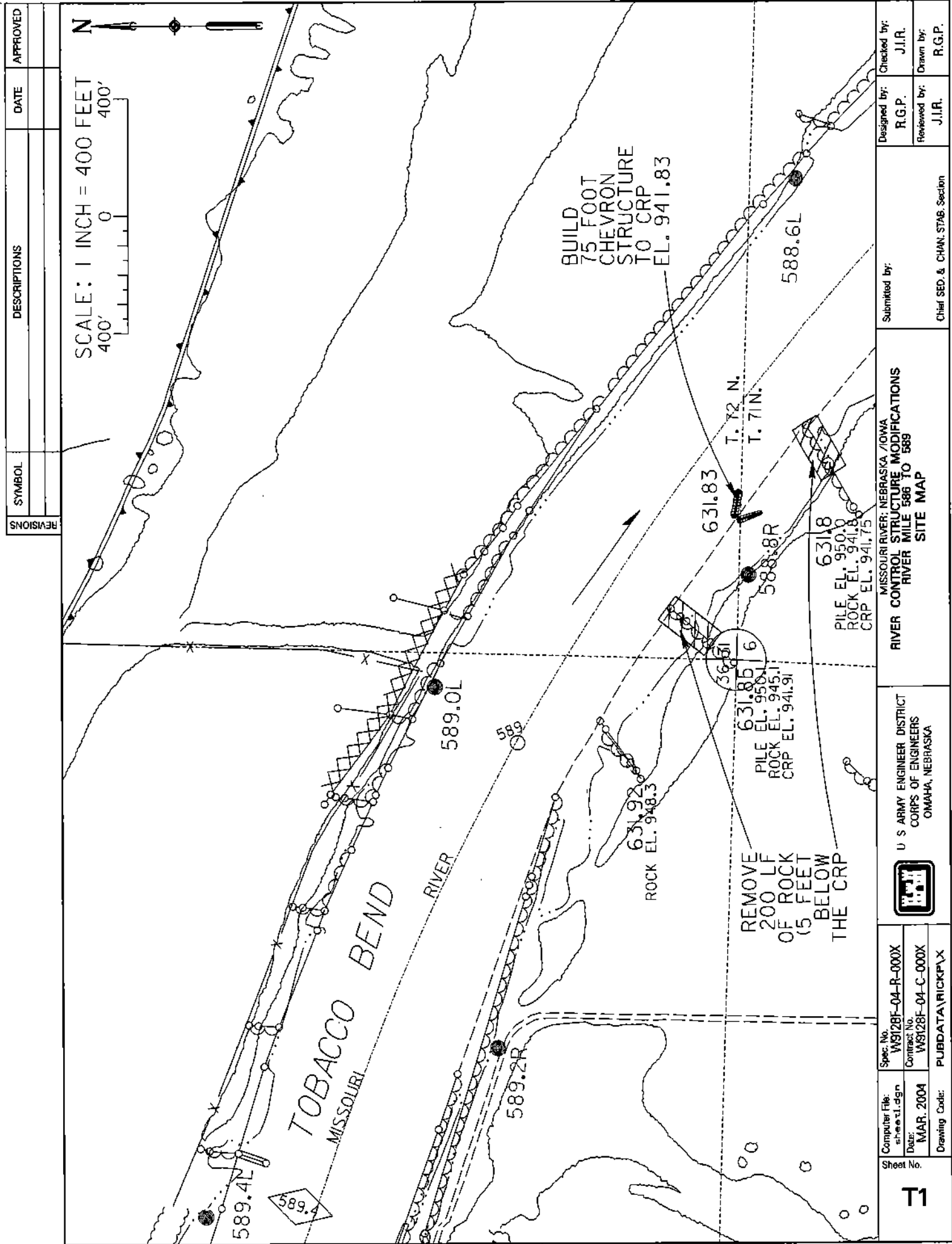


PROJECT SITE

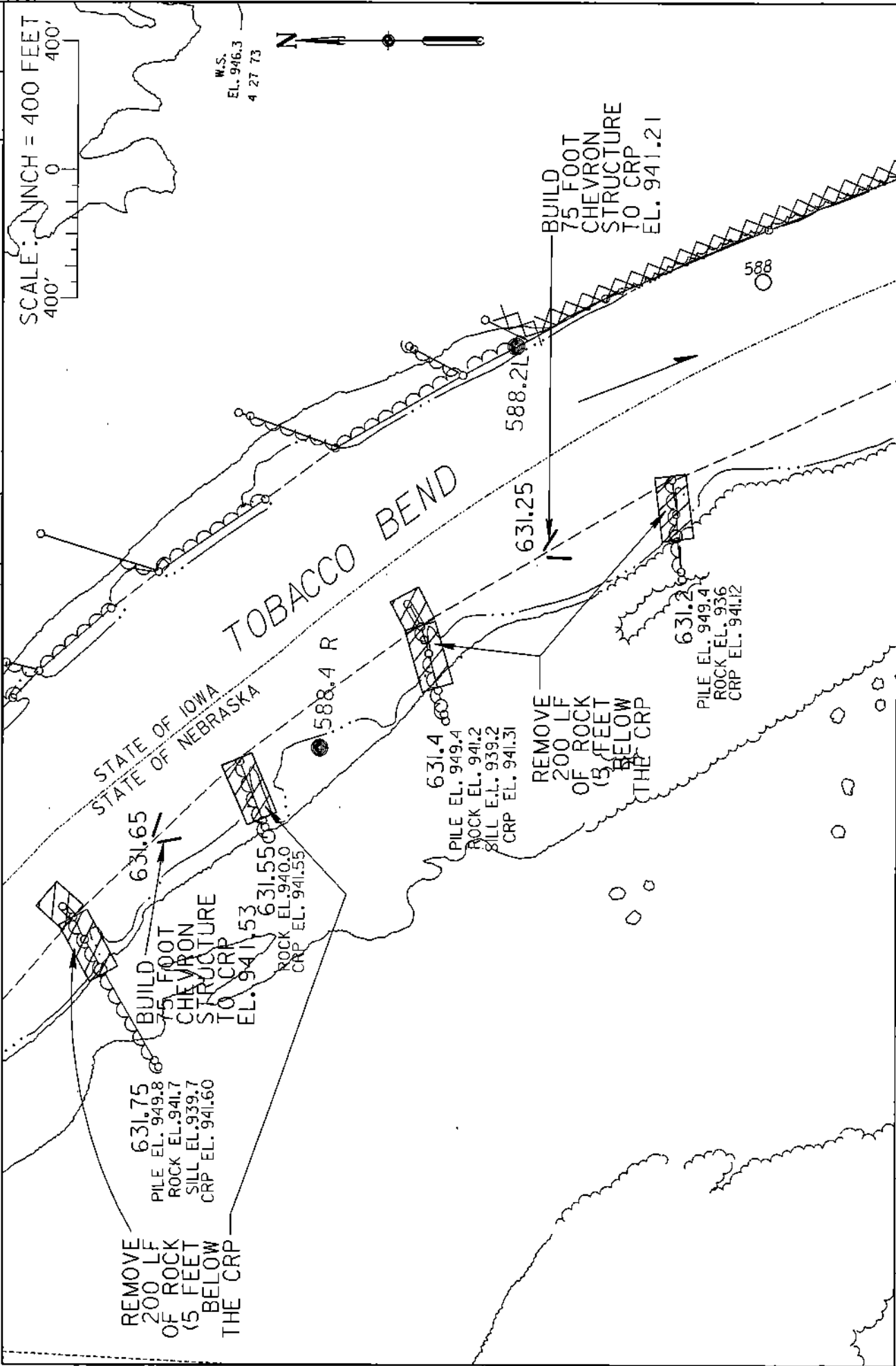
VICINITY MAP
NOT TO SCALE

Computer File: SHEET0.DGN Date: MAR. 2004 Drawing Code: PUBDATA\RICKP\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 586 TO 589 SITE MAP	Submitted by: Chief SED & CHAN, STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

TO

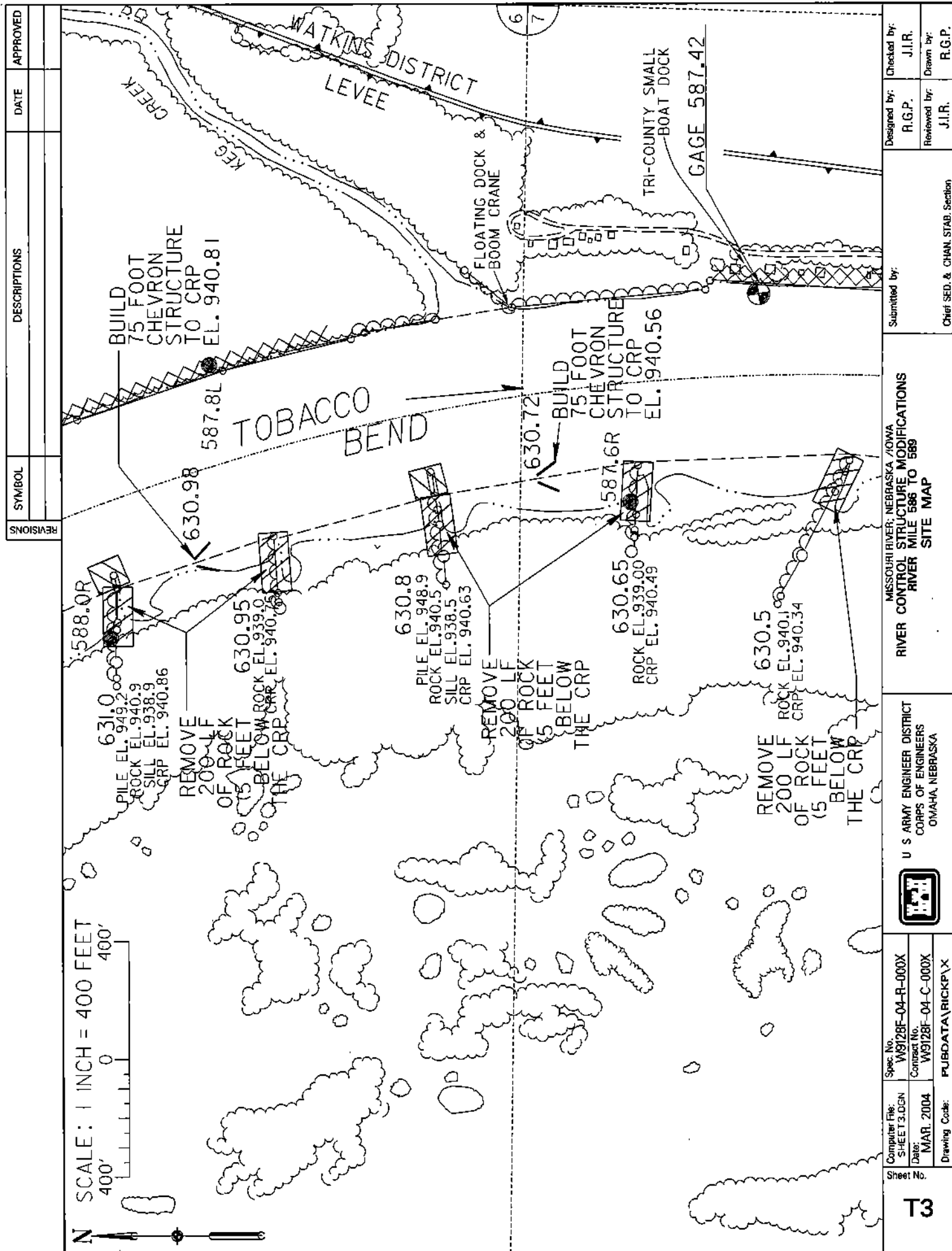


REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



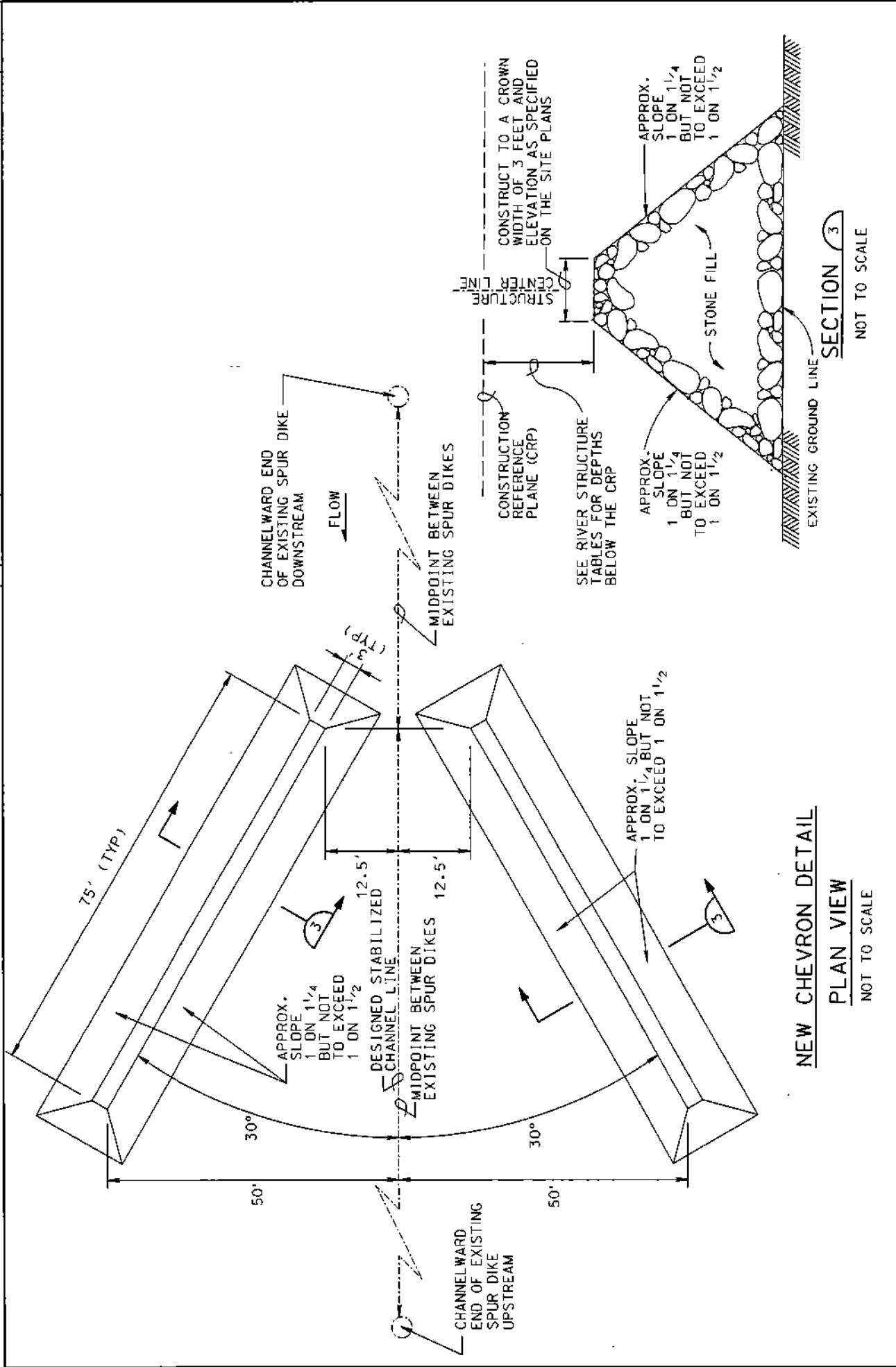
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					Reviewed by: J.I.R.	Drawn by: R.G.P.

T2



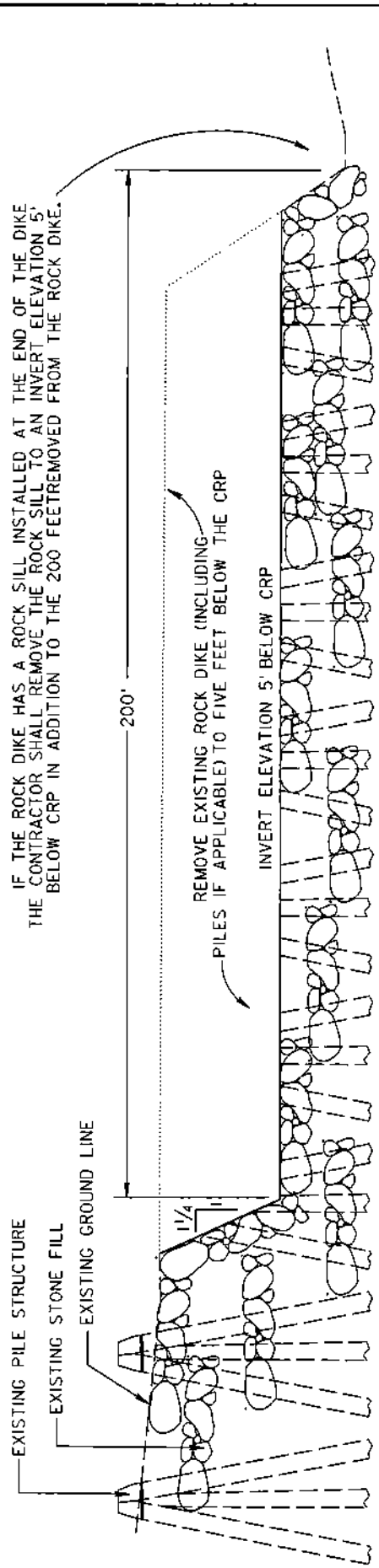
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REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



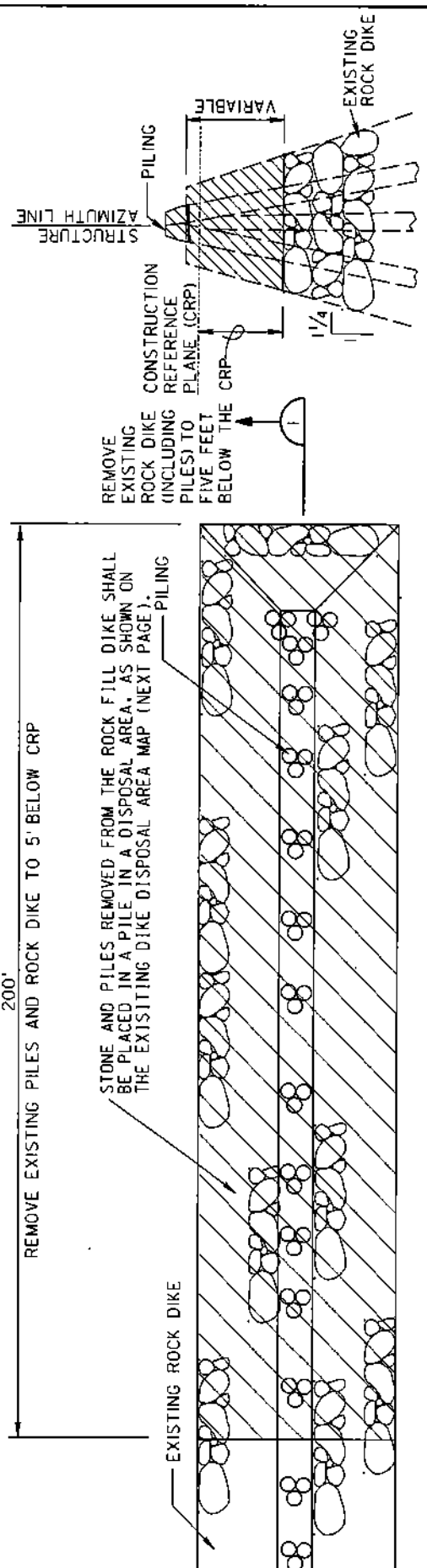
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					Reviewed by: J.I.R.	Drawn by: R.G.P.

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



SECTION 1

NOT TO SCALE



DIKE REMOVAL DETAIL

PLAN VIEW

NOT TO SCALE

SECTION 2

NOT TO SCALE

Computer File: SHEET8.DGN Date: MAR. 2004 Drawing Code: PUDDATA\RICKP\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER; NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 586 TO 589 EXISTING DIKE REMOVAL DETAILS	Submitted by: Chief SED & CHAN STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
						Reviewed by: J.I.R.	Drawn by: R.G.P.

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

BENCH MARK INFORMATION

POINT	BANK	NORTHING	EASTING	ELEVATION
586.4	R	14888203.90969	857576.22774	947.53000
586.6	L	14888710.18409	858782.62193	946.02000
586.8	R	14889959.20301	858674.02856	946.19000
587.0	L	14890303.93773	859617.09955	950.18000
587.2	R	14891912.53990	859314.05783	945.70000
587.4	L	14892796.63900	860110.21285	950.33000
587.6	R	14893683.21223	859352.58893	948.12000
587.8	L	14895132.39772	859817.48427	948.28000
588.0	R	14895455.02969	858898.71469	949.45000
588.2	L	14896816.37663	859105.51119	948.90000
588.4	R	14897425.08750	857854.02065	947.60000
588.6	L	14898698.67720	857657.03261	951.31000
588.8	R	14898859.53631	856297.37784	948.18000
589.0	L	14899943.38897	855904.64182	950.00000
589.2	R	14899735.19739	854690.69294	951.12000
589.4	L	14900713.79650	854097.24865	946.93000

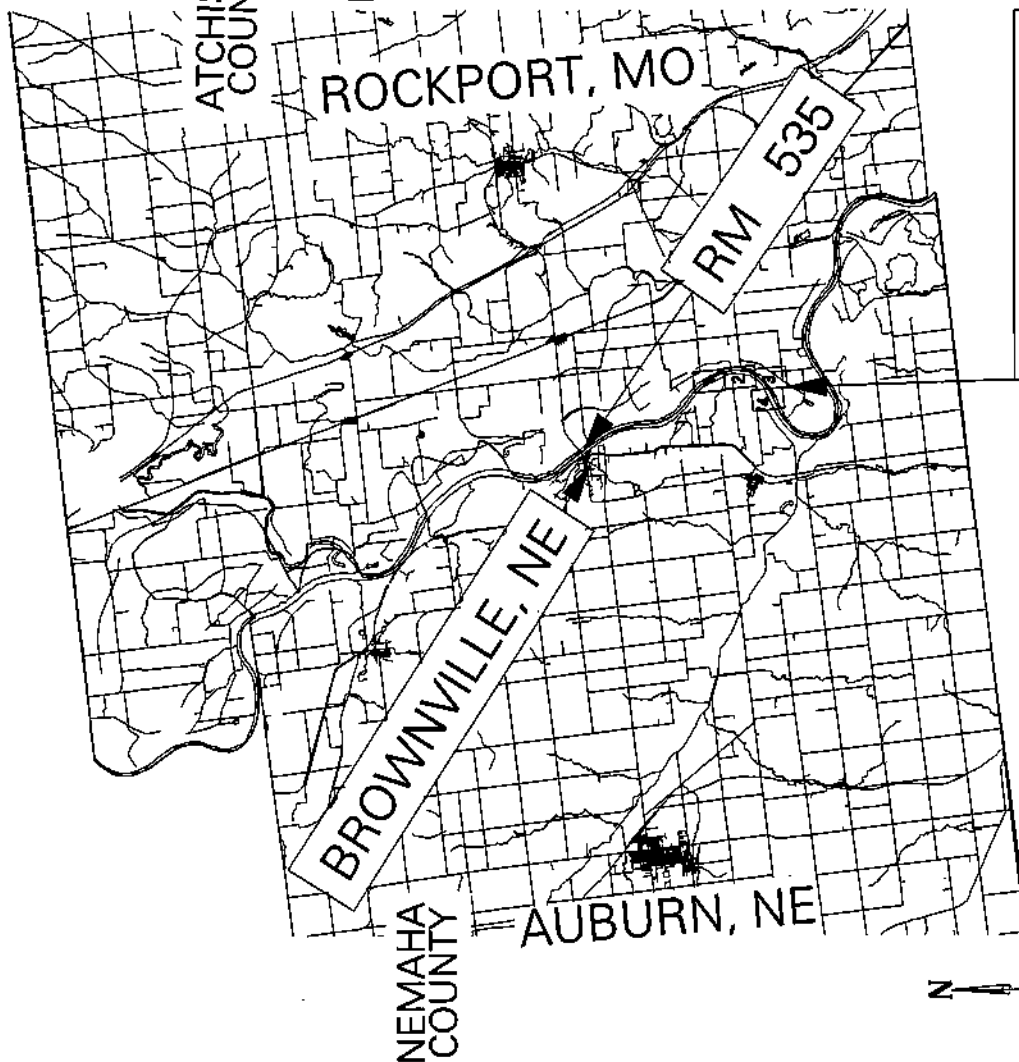
CONDITION OF MISSOURI RIVER CONTROL POINTS:

1. NO EFFORT HAS BEEN MADE TO MONITOR THESE POINTS. SOME HAVE ERODED INTO THE RIVER WHILE OTHERS MAY BE BURIED UNDER 1-5 FEET OF SEDIMENT.
2. EACH CONTROL POINT IS A 3-1/4 INCH DIAMETER CORPS OF ENGINEERS BRASS CAP. THEY ARE STAMPED WITH THE RIVER MILE AND LEFT/RIGHT BANK.
3. THE CONTROL POINTS ARE MARKED WITH ORANGE FIBERGLASS WITNESS POSTS (CARSONITE BRAND). THE POSTS WERE TYPICALLY SET 3-8 INCHES LANDWARD OF THE BRASS CAP.
4. HORIZONTAL CONTROL: UTM ZONE 15, NAD 83
VERTICAL CONTROL: NGVD 29 (ALSO REFERENCED AS "MEAN SEA LEVEL" DATUM)

T10 Computer File: W9128F-04-R-000X Sheet: 10 of 10 Date: MAR. 2004 Drawing Code: PUBDATA\RICKP\X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / IOWA RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 586 TO 589 BENCHMARK INFORMATION	Submitted by:	Designed by:	Checked by:
			Chief SED. & CHAN. STAB. Section	R.G.P.	J.I.R.
			Reviewed by:		Drawn by:
			J.I.R.		R.G.P.

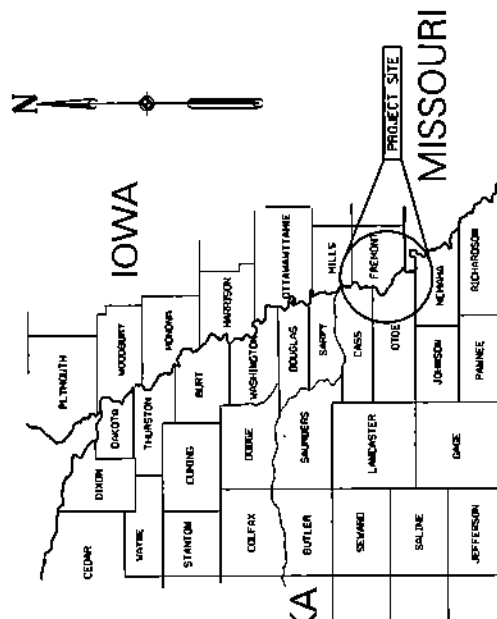
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

SOUTH DAKOTA



VICINITY MAP
NOT TO SCALE

PROJECT SITE



LOCATION MAP
NOT TO SCALE

LEGEND

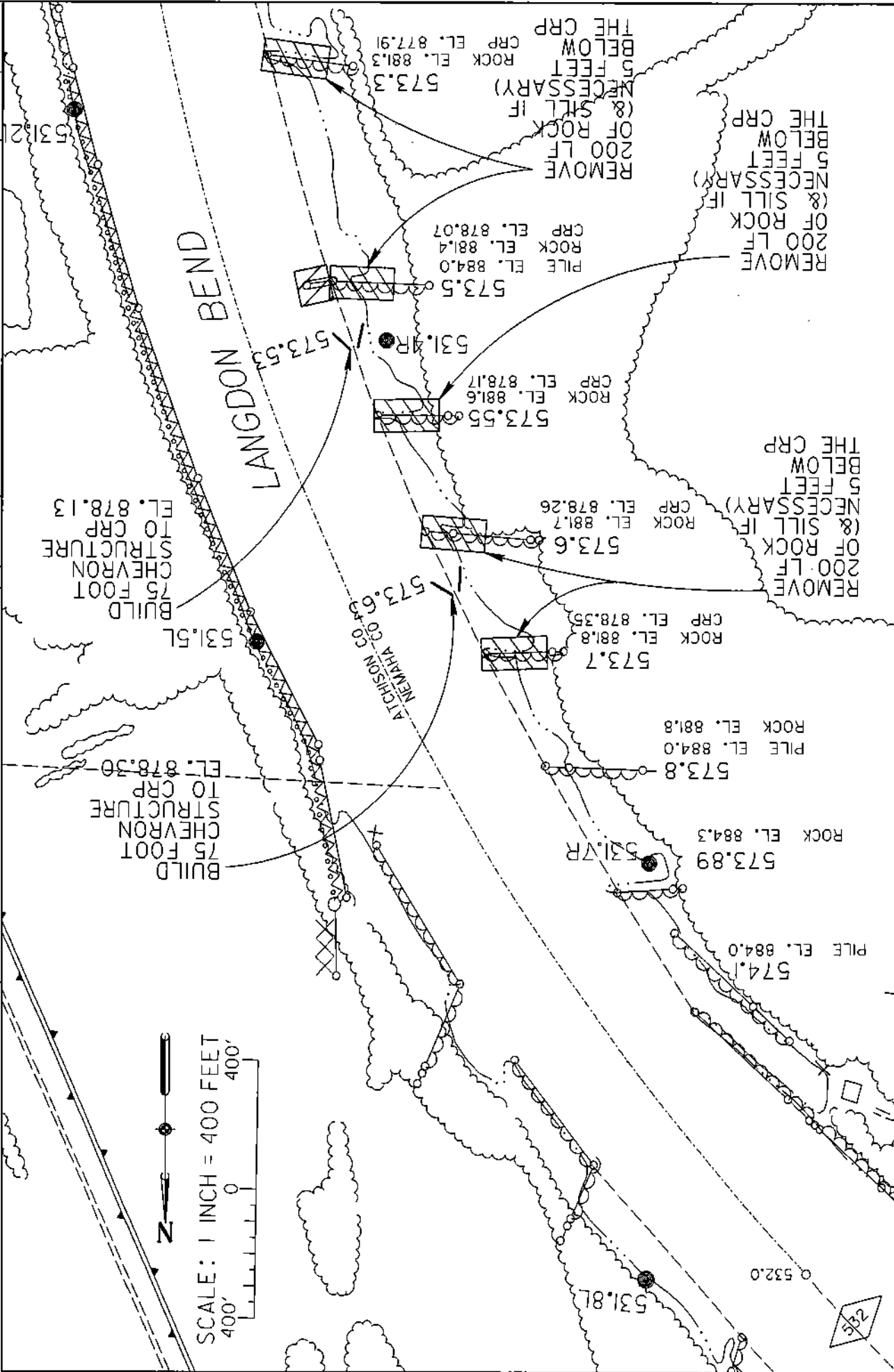
- PILE DIKE
- STONE FILL DIKE OR REVETMENT OR PILE DIKE STONE FILL
- PILE REVETMENT
- PILE REVETMENT, STONE FILL
- TOE TRENCH OR STANDARD REVETMENT OR REINFORCED STD. REVET. OR ACCRETMENT
- ASPHALT REVETMENT
- DESIGNED STABILIZED CHANNEL LINE
- BLUFF LINE
- 1960 CHANNEL MILEAGE
- BEND CHANGE

STRUCTURE NUMBERS ARE BASED ON 1890 MILEAGE

THIS IS THE CONSTRUCTION REFERENCE PLANE WHICH REPRESENTS A SYNTHESIZED WATER SURFACE PROFILE OF A STEADY DISCHARGE THAT IS EQUALED OR EXCEEDED 75% OF THE TIME DURING THE NAVIGATION SEASON (APRIL - NOVEMBER).

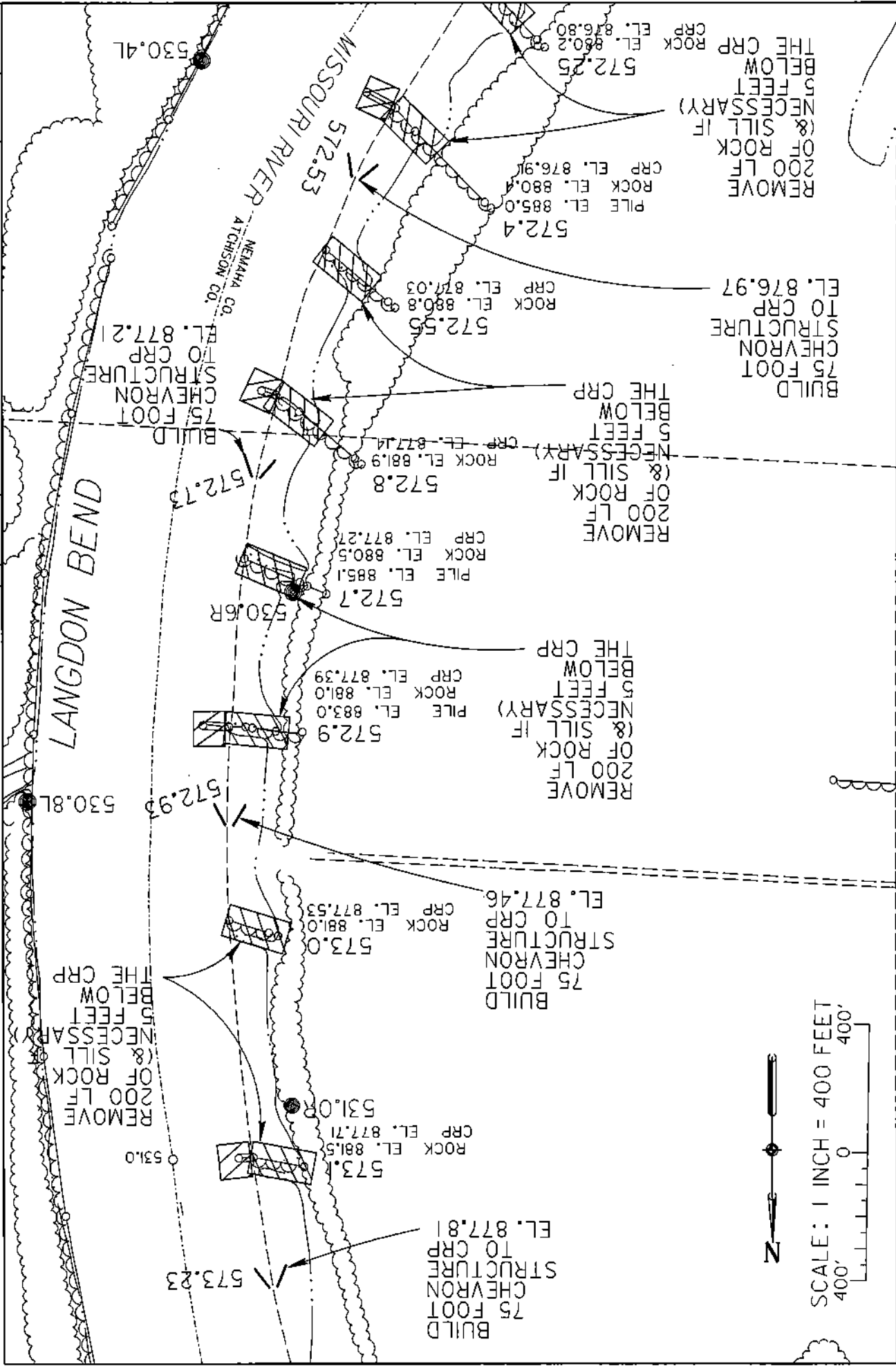
Computer File: SHEET 01.DGN	Spec No: W9128F-04-R-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 SITE MAP	Submitted by: R.G.P.	Designed by: J.I.R.
Date: NOV. 2004	Contract No. W9128F-04-C-000X			Reviewed by: J.I.R.	Drawn by: R.G.P.
Drawing Code: PUBDATA\RICKP\X					

SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			



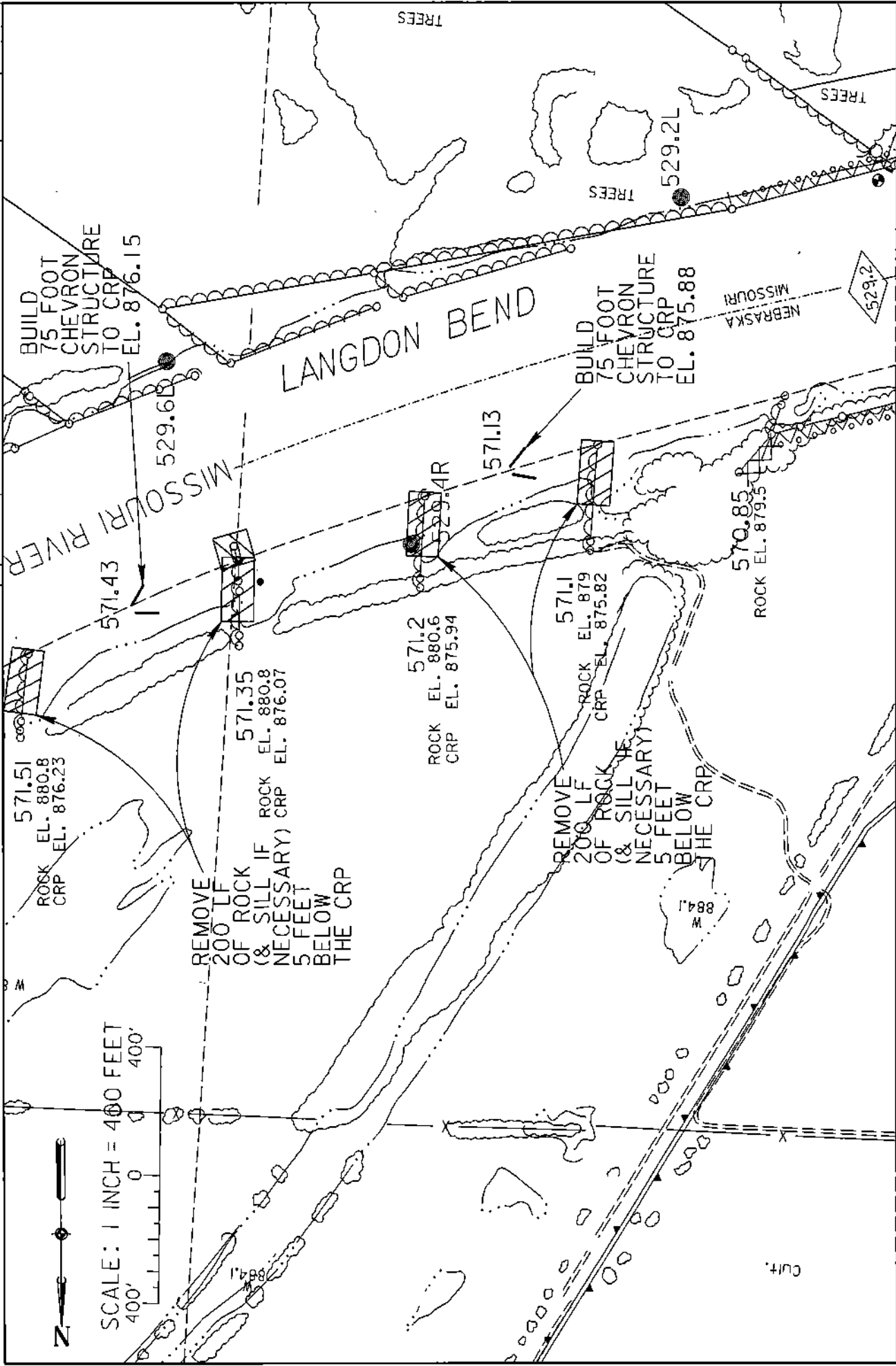
Sheet No. L1	Computer File: sheet1.dgn	Spec. No. W9128F-04-R-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA /MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 SITE MAP	Submitted by: Chief SED. & CHAN STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
	Date: NOV. 2004	Contract No. W9128F-04-C-000X					Reviewed by: J.I.R.	Drawn by: R.G.P.
	Drawing Code: PUBDATA\RICKP\X							

SYMBOL	DESCRIPTIONS	DATE	APPROVED
REVISIONS			



Computer File: sheet2.dgn Date: NOV. 2004 Drawing Code: PUBDATA\RICKP\X	Spec No: W9128F-04-R-000X Contract No: W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 SITE MAP	Submitted by: Chief SED & CHAN STAB Section	Designed by: J.I.R.	Checked by: J.I.R.
					Reviewed by: J.I.R.	Drawn by: R.G.P.

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED




Computer File: sheet 4 of 2 Date: NOV. 2004 Drawing Code: PUBDATA\RICKP\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 SITE MAP	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P. Reviewed by: J.I.R.	Checked by: J.I.R. Drawn by: R.G.P.

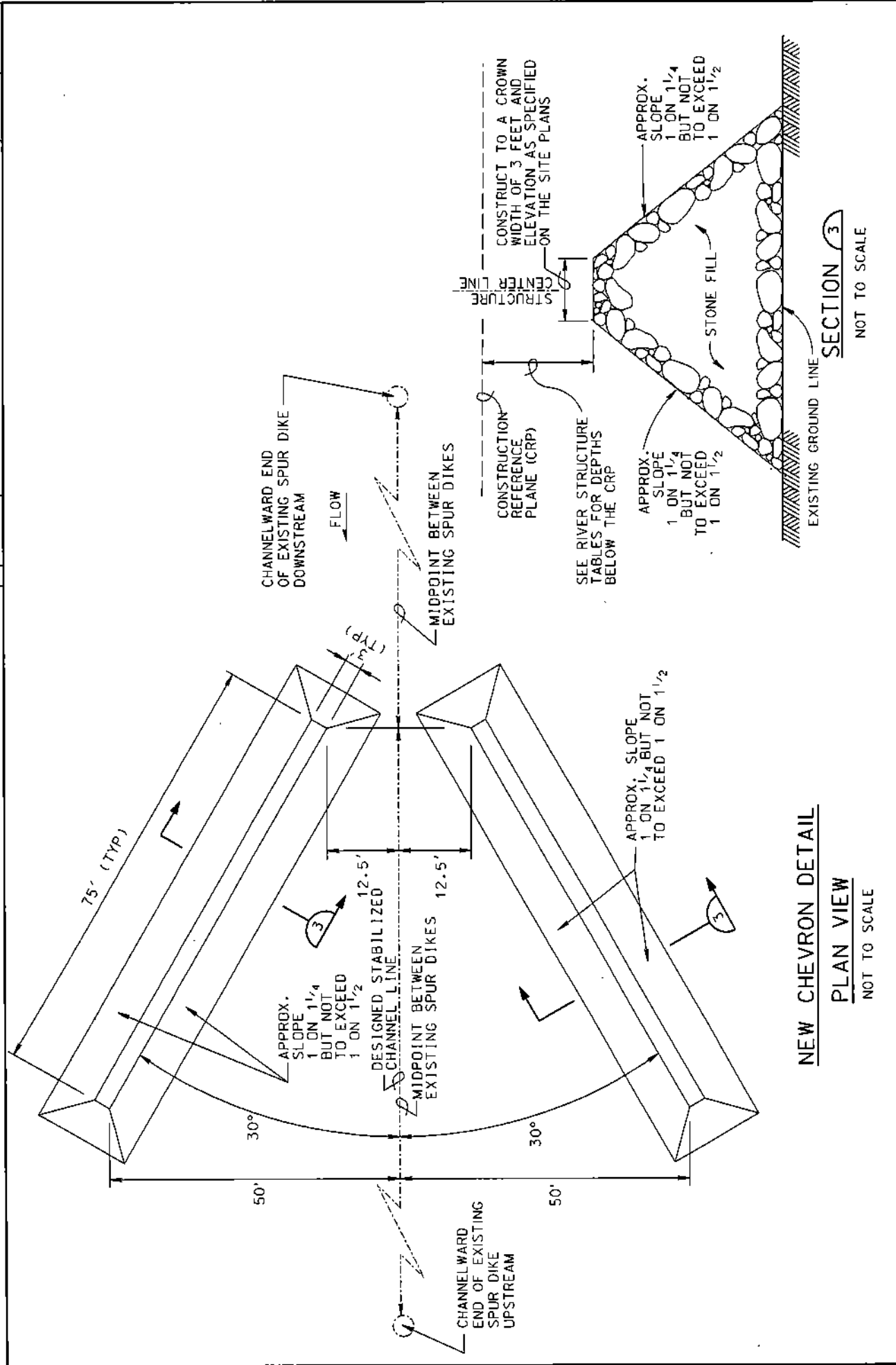
SYMBOL	DESCRIPTIONS	DATE	APPROVED

RIVER STRUCTURE TABLE

RIVER MILE	STRUCTURE NUMBER	BANK	RIPRAP MATERIAL REMOVED TO DEPTH BELOW CRP	RIPRAP MATERIAL PLACED TO DEPTH BELOW CRP
531.57	573.70	RT	5 FEET	---
531.53	573.63	RT	---	0 FEET
531.49	573.60	RT	5 FEET	---
531.41	573.55	RT	5 FEET	---
531.37	573.53	RT	---	0 FEET
531.32	573.50	RT	5 FEET	---
531.18	573.30	RT	5 FEET	---
531.09	573.23	RT	---	0 FEET
531.00	573.10	RT	5 FEET	---
530.84	573.00	RT	5 FEET	---
530.78	572.93	RT	---	0 FOOT
530.71	572.90	RT	5 FEET	---
530.49	572.80	RT	5 FEET	---
530.55	572.73	RT	---	0 FOOT
530.61	572.70	RT	5 FEET	---
530.39	572.55	RT	5 FEET	---
530.34	572.53	RT	---	0 FOOT
530.29	572.40	RT	5 FEET	---
530.19	572.25	RT	5 FEET	---
530.15	572.23	RT	---	0 FEET
530.10	572.10	RT	5 FEET	---
529.93	571.90	RT	5 FEET	---
529.87	571.73	RT	---	0 FEET
529.81	571.60	RT	5 FEET	---
529.68	571.51	RT	5 FEET	---
529.61	571.43	RT	---	0 FEET
529.54	571.35	RT	5 FEET	---
529.42	571.20	RT	5 FEET	---
529.37	571.13	RT	---	0 FEET
529.32	571.10	RT	5 FEET	---

Computer File: W9128F-04-R-000X Sheet: 5 of 5 Date: NOV. 2004 Drawing Code: PUBDATA\PIKPA\X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 SITE MAP	Submitted by: Chief SED & CHAN STAB. Section	Designed by: R.G.P.	Checked by: J.I.R.
			Reviewed by: J.I.R.	Drawn by: R.G.P.	

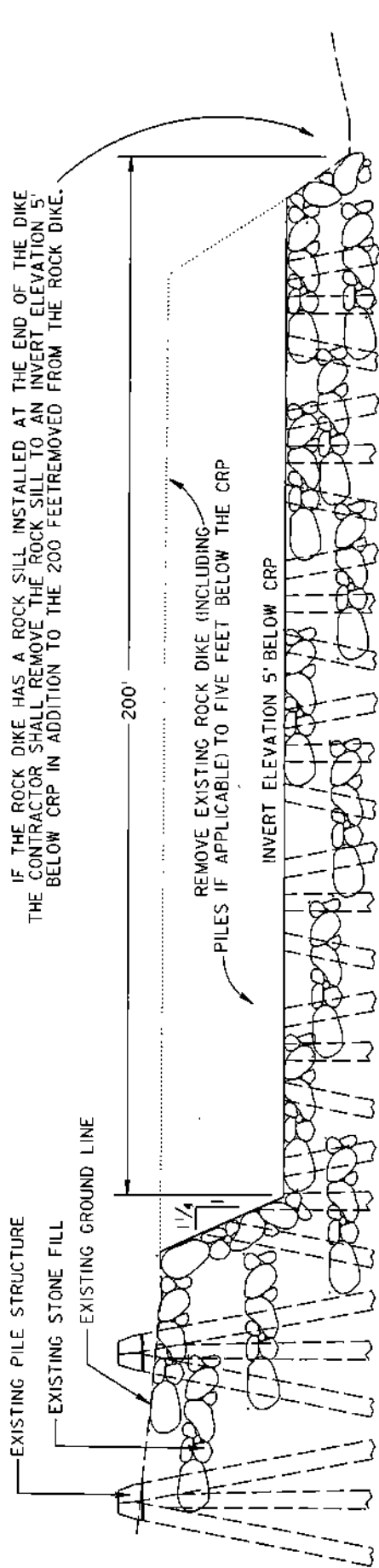
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Computer File: SHEETS.DGN Date: NOV. 2004 Drawing Code:	Spec. No. W912BF-04-R-000X Contract No. W912BF-04-C-000X		U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER, NEBRASKA / MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 CHEVRON STRUCTURE	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by:	Checked by:
						R.G.P.	J.I.R.
Sheet No.	L6					Reviewed by:	Drawn by:
						J.I.R.	R.G.P.

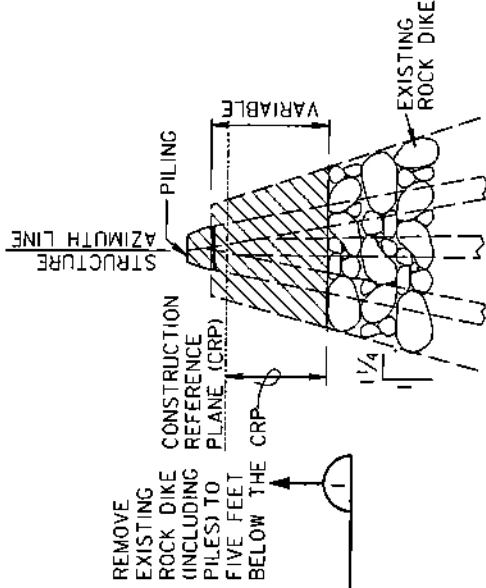
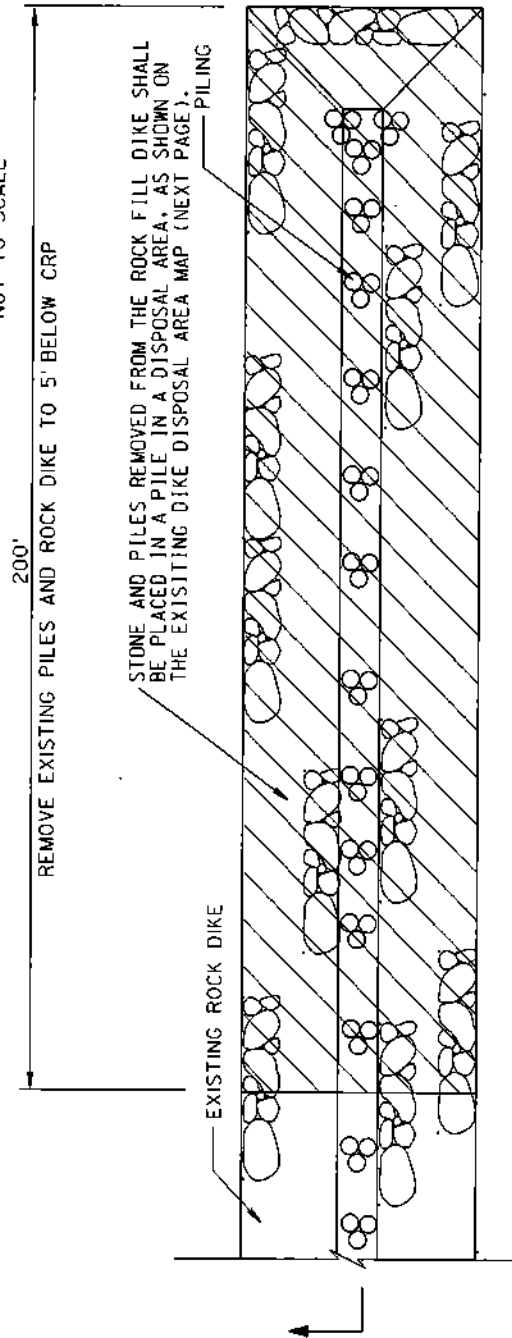
REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

IF THE ROCK DIKE HAS A ROCK SILL INSTALLED AT THE END OF THE DIKE THE CONTRACTOR SHALL REMOVE THE ROCK SILL TO AN INVERT ELEVATION 5' BELOW CRP IN ADDITION TO THE 200 FEET REMOVED FROM THE ROCK DIKE.



SECTION 1

NOT TO SCALE



DIKE REMOVAL DETAIL

PLAN VIEW

NOT TO SCALE

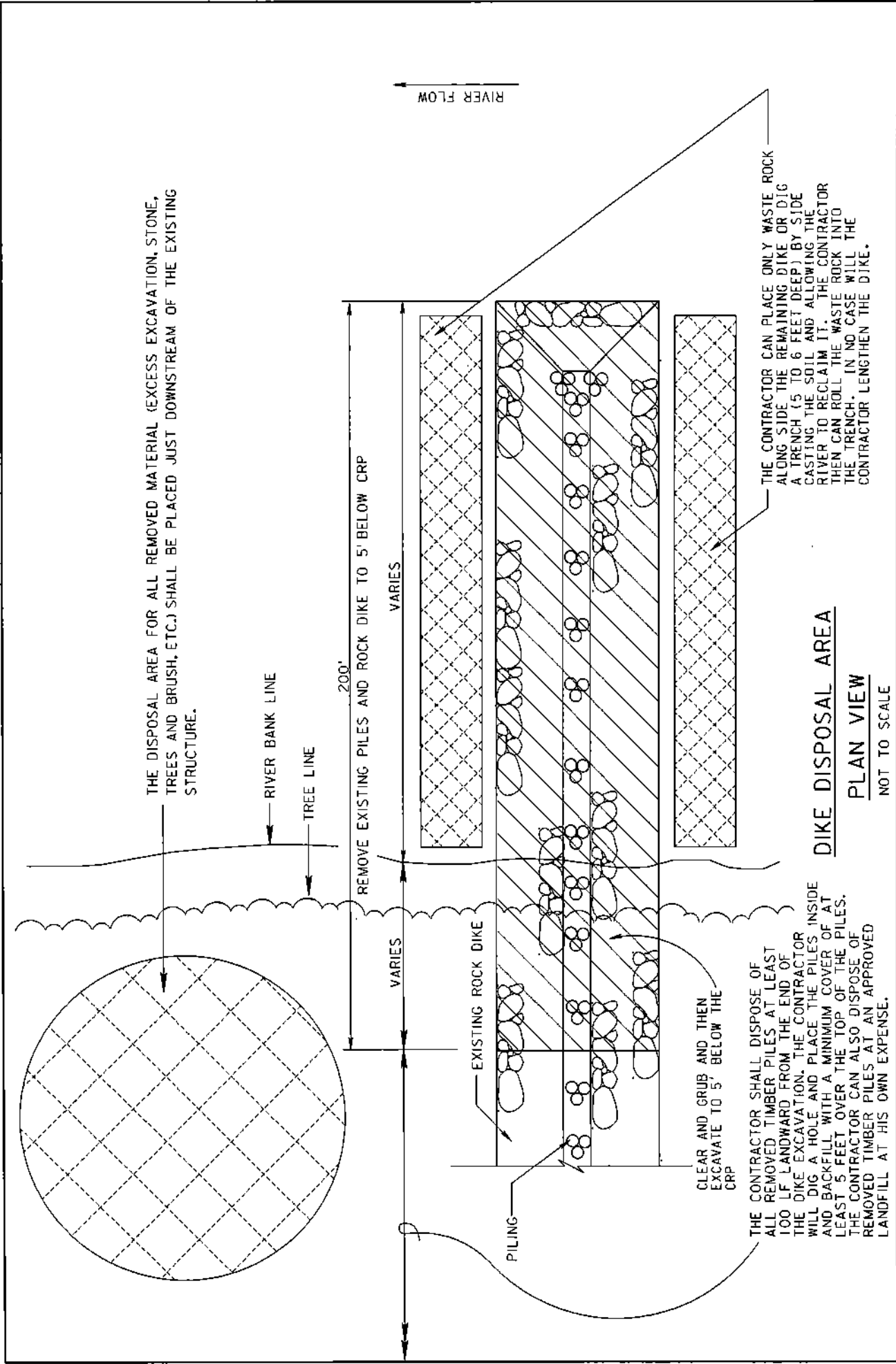
SECTION 2

NOT TO SCALE

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					Reviewed by: J.I.R.	Drawn by: R.G.P.



REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED



Computer File: SHEET 8.DGN	Spec. No. W9128F-04-P-000X	Contract No. W9128F-04-C-000X	Drawing Code: PUBDATA\RICKP\X	U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER; NEBRASKA /MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 EXISTING DIKE DISPOSAL AREA MAP	Submitted by: Chief SED & CHAN, STAB, Section	Designed by:	Checked by:
							R.G.P.	J.I.R.
Date: NOV. 2004							Reviewed by:	Drawn by:
							J.I.R.	R.G.P.

REVISIONS	SYMBOL	DESCRIPTIONS	DATE	APPROVED

BENCH MARK INFORMATION		
POINT	COORDINATE POINT	ELEVATION
529.2L	N264169.49 E3075897.09	883.19
529.4R	N265270.26 E3076677.52	886.83
529.6L	N264778.42 E3077489.32	884.57
529.8R	N266036.49 E3078152.41	886.17
530.0L	N265760.62 E3079148.67	884.76
530.2R	N267015.80 E3079355.18	884.26
530.4L	N267577.99 E3080573.19	890.15
530.6R	N269204.52 E3080156.42	888.31
530.8L	N269930.71 E3080917.95	889.84
531.0R	N270770.73 E3080038.40	886.60
531.2L	N271993.04 E3080474.46	885.56
531.4R	N272623.78 E3079464.39	887.36
531.5L	N273577.67 E3079789.99	890.05
531.7R	N274128.27 E3078451.76	887.10
531.9L	N275445.75 E3078409.54	886.31

CONDITION OF MISSOURI RIVER CONTROL POINTS:

1. NO EFFORT HAS BEEN MADE TO MONITOR THESE POINTS. SOME HAVE ERODED INTO THE RIVER WHILE OTHERS MAY BE BURIED UNDER 1-5 FEET OF SEDIMENT.
2. EACH CONTROL POINT IS A 3-1/4 INCH DIAMETER CORPS OF ENGINEERS BRASS CAP. THEY ARE STAMPED WITH THE RIVER MILE AND LEFT/RIGHT BANK.
3. THE CONTROL POINTS ARE MARKED WITH ORANGE FIBERGLASS WITNESS POSTS (CARSONITE BRAND). THE POSTS WERE TYPICALLY SET 3-8 INCHES LANDWARD OF THE BRASS CAP.
4. HORIZONTAL CONTROL: STATE PLANE, NAD 27, NEBRASKA SOUTH
VERTICAL CONTROL: NGVD 29

	Computer File: Sheet 1 of 1 Date: NOV. 2004 Drawing Code: PUBDATA\RICKP\X	Spec. No. W9128F-04-R-000X Contract No. W9128F-04-C-000X	 U S ARMY ENGINEER DISTRICT CORPS OF ENGINEERS OMAHA, NEBRASKA	MISSOURI RIVER: NEBRASKA / MISSOURI RIVER CONTROL STRUCTURE MODIFICATIONS RIVER MILE 529 TO 532 BENCHMARK INFORMATION	Submitted by: Chief SED. & CHAN. STAB. Section	Designed by: R.G.P. Reviewed by: J.I.R.	Checked by: J.I.R. Drawn by: R.G.P.
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APPENDIX C

COMPLIANCE WITH ENVIRONMENTAL STATUTES

COMPLIANCE WITH ENVIRONMENTAL STATUTES

American Indian Religious Freedom Act (AIRFA) of 1978, 42 U.S.C. 1996.

In compliance.

AIRFA protects the rights of Native Americans to exercise their traditional religions by ensuring access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. This project would not adversely affect the protections offered by this Act. Access to sacred sites by Tribal members would not be affected.

Bald Eagle Protection Act, 16 U.S.C. Sec. 668, 668 note, 668a-668d.

In compliance.

The Endangered Species Act (ESA) contains requirements on Corps projects concerning bald eagles. See Endangered Species Section of the EA.

Clean Air Act, as amended, 42 U.S.C. 1857h-7, et seq.

In compliance.

The purpose of this Act is to protect public health and welfare by the control of air pollution at its source, and to set forth primary and secondary National Ambient Air Quality Standards to establish criteria for States to attain, or maintain. Some temporary emission releases may occur during construction activities; however, air quality is not expected to be impacted to any measurable degree.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq.

In compliance.

The objective of this Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters (33 U.S.C. 1251). The Corps regulates discharges of dredge or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act. This permitting authority applies to all waters of the United States including navigable waters and wetlands. The selection of disposal sites for dredged or fill material is done in accordance with the Section 404(b)(1) guidelines, which were developed by the U.S. Environmental Protection Agency (see 40 CFR Part 230). General permits are a type of authorization that is issued on a nationwide or regional basis for a category or categories of activities. Activities that are authorized under general permits must be substantially similar in nature and cause only minimal individual or cumulative adverse effects on the aquatic environment. Nationwide permits are a type of general permit that authorize certain specified activities nationwide that have been authorized after meeting requirements of NEPA and extensive coordination with the EPA and other federal agencies. Some nationwide permit activities do not require notification to the Corps. All terms and conditions of the nationwide permits must be met in order for an activity to be authorized by nationwide permit. Wetland authorization requirements for this activity will be covered under a Nationwide Section 27 "Stream and Wetland Restoration Activities" authorization. Section 401 of the Clean Water Act allows states to grant or deny water quality certification for any activity, which results in a discharge to waters of the United States and requires a federal permit or license. Certification requires a finding by the state that the activities permitted will comply with all water quality standards individually or cumulatively over the term of the permit. The Nebraska Department of Environmental Quality, and the Iowa Department of Natural Resources have granted section 401 water quality certification for this nationwide authorization.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

Not applicable.

Typically CERCLA is triggered by (1) the release or substantial threat of a release of a hazardous substance into the environment; or (2) the release or substantial threat of a release of any pollutant or contaminant into the environment which presents an imminent threat to the public health and welfare. To the extent such knowledge is available, 40 CFR Part 373 requires notification of CERCLA hazardous substances in a land transfer. This project will not involve any real estate transactions.

Endangered Species Act, as amended, 16 U.S.C. 1531, et seq.

In compliance.

Section 7 (16 U.S.C. 1536) states that all Federal departments and agencies shall, in consultation with and with the assistance of the Secretary of the Interior, insure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any threatened or endangered (T&E) species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical. This project is being completed under the auspices of the Biological Opinion for the Missouri River as amended. Via the BiOp, and subsequent coordination between the Corps and the Service, consideration has already been given to the biological effects of the construction of shallow water in the development of the Reasonable and Prudent Alternative for the Opinion and determined that it is an integral component to avoid jeopardy to listed species. Informal coordination on site-specific issues are being coordinated with the Service and pertinent state agencies.

Environmental Justice (E.O. 12898).

In compliance.

Federal agencies shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States. The project does not disproportionately impact minority or low-income populations.

Farmland Protection Policy Act (Subtitle I of Title XV of the Agriculture and Food Act of 1981), effective August 6, 1984.

Not applicable.

This Act instructs the Department of Agriculture, in cooperation with other departments, agencies, independent commissions and other units of the Federal government, to develop criteria for identifying the effects of Federal programs on the conversion of farmland to nonagricultural uses. No farmland would be adversely impacted by the proposed project.

Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1(12), et seq.

In compliance.

The Act establishes the policy that consideration be given to the opportunities for outdoor recreation and fish and wildlife enhancement in the investigating and planning of any Federal navigation, flood control, reclamation, hydroelectric or multi-purpose water resource project, whenever any such project can reasonably serve either or both purposes consistently. The purpose of the project can be considered fish and wildlife enhancement and it will not negatively impact recreational use of the river.

Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq.

Partial compliance. The FWCA requires governmental agencies, including the Corps, to coordinate activities so that adverse effects on fish and wildlife will be minimized when water bodies are proposed for modification. Coordination pertaining to 404 wetland issues has been completed during the formal acceptance of the Nationwide 27 authorization. The U.S. Fish and Wildlife Service in Columbia, Missouri, and the appropriate State fish and wildlife agencies in the three affected states are being informally coordinated with for this project however. The state of Missouri and Iowa have provided comments on the activities, and the Service and State of Nebraska are expected to provide specific comments related to this action soon. See appendix D for coordination already completed to date.

Land and Water Conservation Fund Act (LWCFA), as amended, 16 U.S.C. 4601-4601-11, et seq.

Not applicable.

Planning for recreation development at Corps projects is coordinated with the appropriate states so that the plans are consistent with public needs as identified in the State Comprehensive Outdoor Recreation Plan (SCORP). The Corps must coordinate with the National Park Service (NPS) to insure that no property acquired or developed with assistance from this Act will be converted to other than outdoor recreation uses. If conversion is necessary, approval of NPS is required, and plans are developed to relocate or re-create affected recreational opportunities. No lands involved in the proposed project were acquired or developed with LWCFA funds.

Migratory Bird Treaty Act

Partial compliance

The Migratory Bird Treaty Act of 1918 (MBTA), is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent overutilization. Executive Order 13186 (2001) directs executive agencies to take certain actions to implement the act. The Corps will be in consultation with the Service with regard to this activities impact on migratory birds.

National Historic Preservation Act, as amended, 16 U.S.C. 470a, et seq.

Partial compliance.

Federal agencies having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking shall take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. Discussions between the corps and SHPO's are ongoing, and final coordination with regard to this law will be completed prior to construction. Discussion is included in the EA with respect to the requirements to this law. The Corps has made the determination that the proposed project does not have the potential to adversely impact cultural resources and SHPO concurrence is expected. Caution will be exercised during all phases of work in order to minimize any disturbance to deeply buried cultural resources. The contractor will be explicitly warned about this possibility and instructed that if any resources are found, he or she should stop work and contact the District Office immediately.

National Environmental Policy Act (NEPA), as amended, 42 U.S.C. 4321, et seq.

In compliance.

This environmental assessment (EA) and finding of no significant impact (FONSI) have been prepared for the proposed action. An environmental impact statement is not required.

Noise Control Act of 1972, 42 U.S.C. Sec. 4901 to 4918.

In compliance.

This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Federal agencies are required to limit noise emissions to within compliance levels. Noise emission levels at the project site will increase above current levels temporarily due to construction; however, appropriate measures will be taken to keep the noise level within the compliance levels.

North American Wetlands Conservation Act, 16 U.S. C. Sec. 4401 et. seq.

Not applicable.

This Act establishes the North American Wetlands Conservation Council (16 U.S.C.4403) (NAWCC) to recommend wetlands conservation projects to the Migratory Bird Conservation Commission (MBCC). Section 9 of the Act (16 U.S.C. 4408) addresses the restoration, management, and protection of wetlands and habitat for migratory birds on Federal lands. Federal agencies acquiring, managing, or disposing of Federal lands and waters are to cooperate with the Fish and Wildlife Service to restore, protect, and enhance wetland ecosystems and other habitats for migratory birds, fish and wildlife on their lands, to the extent consistent with their missions and statutory authorities. There will be no disposal of land with this project.

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)

In compliance.

This law prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Secretary's approval authority has since been delegated to the Chief of Engineers. Because the Corps of Engineers is doing this project, no authorization is required because the law specifically exempts the Corps of Engineers from regulation under Section 10.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1101, et seq.

Not applicable.

This Act authorizes the Secretary of Agriculture to cooperate with states and other public agencies in works for flood prevention and soil conservation, as well as the conservation, development, utilization, and disposal of water. This act imposes no requirements on Corps Civil Works projects.

Flood plain Management (E.O. 11988).

In compliance.

Section 1 requires each agency to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. This project will not affect the flood holding capacity or flood surface profiles of any stream. The proposed project would increase the top width of the river, and could potentially increase the river's capacity to handle flood flows.

Protection of Wetlands (E.O. 11990).

In compliance.

Federal agencies shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agencies responsibilities. Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors. Each agency shall also provide opportunity for early public review of any plans or proposals for new construction in wetlands. Significant impacts to existing wetlands are not expected, however, conversion from palustrine wetlands to riverine wetlands may occur to some extent. (See Clean Water Act above)

CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory.

Not applicable.

This memorandum states that each Federal agency shall take care to avoid or mitigate adverse effects on rivers identified in the Nationwide Inventory (FR 1980). No portion of this project is listed on the Nationwide Rivers Inventory.

Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.

Not applicable.

This act establishes that certain rivers of the Nation, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The area in which the proposed activity would occur is not designated as a wild or scenic river, nor is it on the National Inventory of Rivers potentially eligible for inclusion.

APPENDIX D

INFORMAL CONSULTATION WITH FEDERAL AND STATE AGENCIES

Coordination is an ongoing process, and the below summarizes coordination up to April 6, 2004. As further coordination is conducted, added information will be appended to the project file.

Initial Coordination

Phone Calls were placed to each of the below agencies on 16 March 2004 and followed up with e-mail on the same date. The e-mail summarized the phone call (and fax to FWS due to e-mail outage):

From: Laux, Eric A NWO
Sent: Tuesday, March 16, 2004 3:00 PM
To: Angi Bruce IDNR - Angi.bruce@dnr.state.ia.us (712) 769-2587
Mark Brohman NGPC - mbrohman@ngpc.state.ne.us (402) 471-5539
Brian Canaday MDC - Brian.Canaday@mdc.mo.gov (573)522-4115 x3371
Jane Ledwin FWS - jane_ledwin@fws.gov (573) 234-2132 x109
Subject:

The Omaha District, U.S. Army Corps of Engineers is currently conducting an Environmental Assessment for Major Dike Modifications on the Missouri River. Attached please find information pertaining the Corps' plan to create shallow water habitat via dike lowering and chevron construction. I am contacting you in regard to any comments [your agency] may have regarding the project. As I am sure you are aware, there has already been formal and informal consultation between the Corps and FWS regarding this issue. As this project is to implement the BiOp, specifically for the pallid sturgeon (RPA element VII.1.b.), the Corps believes this project to be beneficial with regard to endangered species, and beneficial in general to increasing depth diversity and top width of the Missouri River channel. The project is scheduled to be completed by July 1st, and any information [your agency] may have with regard to the project (in addition to that previously provided) would be appreciated. The EA is planned to be completed by April 5th in order to quickly move into the construction phase of the project to meet the July 1st deadline of the BiOp. A prompt email or phone call forwarding your thoughts would be appreciated in order that any comments you may have can be taken into consideration prior to implementation. If you could coordinate a response with others in your office that would want input, I would appreciate it.

Thanks for any input you may provide. I look forward to discussing the project with you.

Attachments-

Description of the activity: Specs of dike lowering and chevron construction:


description of dike
mod action...


dike mod detail.pdf

Background recent coordination between Corps and FWS:

  
Service response 5 March.doc attachment 2 mar
1100.DOC letter 2
marfinal.doc

Subsequent Coordination with the Fish and Wildlife Service

Follow-up phone call from Eric Laux (Corps) to Jane Ledwin (Service, Columbia, MO), 31 March:

In a conversation between Eric Laux and Jane Ledwin, Jane mentioned that a conference call was recently conducted with Corps and FWS personnel, of which she was not a part. She said that JoAnn Grady (FWS, Columbia MO) and Bob Harms (FWS Grand Island Field Office) were participants in the phone call, and until Bob completed his meeting report, and until the FWS had completed a conference call of their own on

Friday, April 02, 2004, she would not have any comments. She suggested I call Bob Harms if I wanted to learn what was discussed on the trip. I did not call Bob, as I wanted to wait to talk to Jane the following week since she is our official contact for the Missouri River Activities.

Notes from John Remus (Corps, NWO) summarizing meeting held with the FWS:

A meeting between the Corps and the FWS was held in KCD on 26 March 2004 to discuss the SWH verification process. Specific objectives of the meeting were: (1) to discuss the various construction activities and to describe in general terms the expected changes, (2) develop a common understanding of the data needs of each organization, (3) discuss measurement methods, (4) develop a common understanding of the measurement capabilities, (5) develop a schedule for joint inspection of the construction areas, and (6) come to a common understanding of the verification process.

Meeting attendees were as follows:

- Mike Chapman, CENWK-EC-HH
- Matt Jeppson, CENWK-OC
- John Remus, CENWO-ED-HF
- Steve Lydick, USFWS-Grand Island NE
- Bob Harms, USFWS-Grand Island NE
- JoAnne Grady, USFWS-Columbia MO
- William Gill, USFWS-Manhattan KS

After introductions, Mike Chapman, explained how notches were constructed, and provided a qualitative description of observed river responses to date. Mike explained in more detail how the original acreage estimates for dike notching were developed. It was explained that these estimates were developed in concert with Jane Ledwin and others at the FWS Columbia Office, and that the Corps feels the FWS is in agreement with process. Steve Lydick raised a concern that the process described for the dikes in the lower river may not apply to the reach above Omaha. Because the original estimates were based on observed hydraulic influence, it is reasonable to expect similar responses in all reaches.

Mike Chapman explained the revetment notching/pilot chute plans that are being developed in the KCD. The explanation included number of sites and linear feet of pilot chute construction. Mike also briefly described a side chute project that will be constructed.

The group discussed how the notching program fits into the overall river plan view. It was explained how notching adjacent structures could create networks of small channels that could connect a series of shallow water areas to each other and to the main channel. The flexibility of the notching concept was also discussed.

John Remus explained the major dike modifications that are planned in the Omaha District, and how this differed from the notching program. The major dike modifications consist of removal of a significant portion of the dikes within a bend and the construction of chevron structures. This concept is aimed at producing a more rapid morphological response within the main channel. An explanation was provided as to how the acreage estimates were developed and expected response times were discussed.

In general the group was in agreement that the above mentioned activities would result in beneficial changes for the Pallid Sturgeon. However, the FWS wanted to make sure these changes resulted in a net gain in SWH and not a redistribution of the same river template. The FWS was also concerned that sediment accretion in one area may erode SWH else where. Neither of these issues is a concern. All indicators point toward net gains in SWH, and sediment yields will not be impacted.

John Remus explained the details of the planned backwater dredging projects, why these sites were chosen, and how the acreages were determined. These projects have a different biological benefit than the projects discussed above, and the FWS team had some concerns regarding the value of these projects. Accessibility and the lack of alluvial dynamics were the main concerns. John Remus explained that the Corps considered all of the projects listed on the attachment to Gen. Grisoli's 2 March 2004 letter to Robyn Thorson would be acceptable as SWH for the 1 July 2004 goal. This is based on attachment to Robyn Thorson's reply. The FWS team promised a determination as to the acceptability of the backwater habitat by 2 April 2004. John Remus indicated to the FWS team that if these projects were not acceptable, this

required official documentation through their Regional Office. This will be discussed at a conference call scheduled for 1 April.

Mike Chapman and John Remus explained that we will not be able to measure every site. Cost and logistics are prohibitive. The Omaha District is planning to obtain most of the surveys through contracts with A/E firms and the USGS. Some data will be collected in-house. The Kansas City District plans to gather the data with their in-house survey crew. John Remus and Mike Chapman will provide proposed survey plans to the FWS for consideration. The plans will indicate the location of surveys and a qualitative description of the types and amounts of data that will be collected. The FWS team will review the plans, and a final agreed to plan will be flushed out during a 1 April 2004 conference call. Matt Jeppson indicated that once the final survey plan is developed, the Corps and FWS should exchange letter indicating official concurrence.

The group discussed the verification process and who would be doing what. The FWS team indicated that Steve Lydick and JoAnne Grady will be conducting the field observation for the FWS. Steve and JoAnne will serve a roll very similar to a construction inspector, and will provide this information to the FWS verification team. The FWS team could not provide any details as to who was on the verification team or what the process was going to be. It was reiterated that the Corps considered the plan outlined in General Grisoli's letter acceptable to all parties and that execution of that plan would be considered sufficient to meet the BiOp requirements. There appears to be a disconnect between the Corps and FWS, or within the FWS, or within the Corps on this issue.

The following joint inspection schedule was developed. The purpose of the inspections is to: (1) allow the FWS to verify the execution of the Corps' plan and develop an understanding of the construction techniques, and (2) make adjustments in the survey plan as needed.

13, 14 and 15 April. Mike Chapman will lead an inspection of selected construction sites within the KCD. JoAnne Grady will represent the FWS. Other team members for both agencies may be included, but the intent is to have a very small group that can travel on either a small boat or by vehicle from site to site.

20 and 21 April. The Corps will conduct an aerial inspection of the Missouri River from Gavins Point Dam to the Mouth. Future aerial inspections will be problematic as there are no common DA/DOI approved vendors. This leaves only the National Guard as a common carrier, and the ability for the NG to support this work is limited at this time. A second aerial inspection will be scheduled in July after the work is done. This inspection will include a digital video record.

27 and 28 April. John Remus will lead an inspection of selected construction sites in the Omaha District. Steve Lydick will represent the FWS. Other team members for both agencies may be included, but the intent is to have a very small group that can travel on either a small boat or by vehicle from site to site.

18 and 19 May John Remus will lead an inspection of selected construction sites in the Omaha District. Steve Lydick will represent the FWS. The itinerary for this trip will be developed by the John Remus and Steve Lydick.

26, 27 and 28 May. Mike Chapman will lead an inspection of selected construction sites in the KCD. JoAnne Grady will represent the FWS. The inspection will follow the Missouri River Natural Resources Conference. The itinerary for this trip will be developed by the Mike Chapman and JoAnne Grady.

Phone Call from Eric Laux (Corps) to Jane Ledwin (Service, Columbia, MO), 05 April 2004:

In a phone call received by Eric Laux on 5 April, Jane Ledwin mentioned that the Service was on board with the project s in a general sense; however, coordination will occur through July 1st, as implementation of the BiOp is an evolving process through time. She mentioned that monitoring is essential before and after the projects in order to better understand the specific results of projects such as the major dike

modifications. She then mentioned that she would have Bob Harms call me in relation to any site specific concerns with potential Bald Eagle occurrences or Migratory Bird Treaty Act recommendations.

Phone Call to Bob Harms, (Service, Grand Island, NE), from Eric Laux (Corps), 06 April 2004:

The discussion focused on site-specific impacts of the SWH projects on potential bald eagle nesting areas and migratory bird compliance. Three sites were known by Bob to occur along the Missouri River, but Carl Preibe (IADNR – Southern Portion of IA), Ed Wiener – (IADNR – Northern portion of IA), and John Dynen (NGPC) would be good contacts for further information.

Bob mentioned that if an active eagle nest is located in the area, general guidance from the service is generally that activity should be avoided within 1/2 mile radius of the nesting site.

With regard to the Migratory Bird Treaty Act, the Service is currently working on specific guidance for activities such as this. Typically, the guidance from the Service is to recommend surveys be completed at each site preceding construction, and once surveys are done, it is suggested that modifications to the project be implemented to avoid take if nests are found within the impact footprint. If no resolution is practicable, then permitting for the take of migratory birds must be undertaken. Further guidance is expected from the service specifically for this project in the near future.

Email from Bob Harms considering Bald Eagles:

From: Robert_Harms@fws.gov [mailto:Robert_Harms@fws.gov]
Sent: Tuesday, April 06, 2004 12:17 PM
To: Laux, Eric A NWO
Cc: Steve_Anschutz@fws.gov; John_Cochnar@fws.gov
Subject: Re: Shallow Water Information - Site Specific info on Eagle Nests and Migratory Birds

Eric:

The following is standard language we routinely include in our letters should there be a potential for bald eagle nesting in the area of proposed project sites.

The bald eagle, federally listed as threatened, nests, migrates, and winters along the Missouri River where they utilize mature, forested, riparian habitats. The bald eagle southward migration begins as early as October and the wintering period extends from December-March. Bald eagles nest from mid-February through mid-August. Observations of nesting eagles along major waterways, including the Missouri River are becoming more common than in the past. It is unknown if bald eagles nest in the vicinity of the proposed project sites along the Missouri River. We are aware of recently active nests at approximate river miles [REDACTED] and it is likely that there are other nests along the

Missouri River. For this reason, the U.S. Fish and Wildlife Service(Service) recommends that a survey for nesting bald eagles be conducted in the area of the proposed project sites, approximately 1-mile upriver and downriver. The Service should be contacted immediately should nesting bald eagles be found.

Disturbances should not occur within 0.5-mile or in line of sight of the nest while the nest is occupied.

Disturbances within 0.5-mile of an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or to abandon eggs.

We are working the Migratory Bird issue here per our AM phone conversation.

I will fax a final letter to you this afternoon.

Bob

Robert R. Harms
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
203 West Second Street
Grand Island, Nebraska 68801
Phone: 308-382-6468, Extension 17
Fax: 308-384-8835
robert_harms@fws.gov

Letter from Steve Anschutz (FWS) for considering Migratory Birds:



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Nebraska Field Office
201 West Second Street
Grand Island, Nebraska 68801

April 6, 2004

Mr. Mike George
Department of the Army
Corps of Engineers, Omaha District
106 South 15th Street
Omaha, NE 68102-1618

Dear Mr. George:

This is in response to requests made by U.S. Army Corps of Engineers (Corps) Project Managers for guidance on complying with the Migratory Bird Treaty Act, (MBTA) (16 U.S.C. 703-712: Ch. 128 *as amended*). The request was made in regards to implementation of reasonable and prudent alternative VII.1.b) for the creation of shallow water habitat and Habitat Restoration/Creation and Acquisition of both shallow water habitat and emergent sandbar habitat as outlined in the 2000 Biological Opinion (BO) and adopted in the 2003 amended BO for operation of the Missouri River Mainstem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River System. Although this guidance applies to the reasonable and prudent alternative, it has applicability to any project conducted or sponsored by the Corps which has the potential to result in the direct take of migratory birds. As such, please feel free to share this guidance with other project managers at the Corps who may be involved in such endeavors.

Under the MBTA, construction activities in rivers, wetlands, streams; and riparian forest, woodland, and grassland habitats that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided and completed outside the nesting season. Specific examples of Corps activities that may result in the take of migratory birds include, but may not be limited to, disposal of spoil in upland sites, disturbance to bank lines, clearing and grubbing, over covering with revetment or fill materials, and clearing to provide overland equipment access to construction sites. The Service recommends that the Corps incorporate all possible measures to avoid the take of migratory birds if the proposed construction project is planned to occur during the primary nesting season or at any other time which may result in the take of nesting migratory birds.

Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens which occur in some wetland habitats normally nest from July 15 to September 10.

The Service appreciates the Corps' involvement in assuming a shared responsibility for protecting Federal trust fish and wildlife resources. Should you have any questions regarding these recommendations, please contact Mr. Robert Harms within our office at (308) 382-6468, extension 17.

Sincerely,

Steve Anschutz
Nebraska Field Supervisor

cc: Corps; Omaha, NE (Attn: Eric Laux)
FWS; Denver, CO (Attn: Mary Henry)
FWS; Bismarck, ND (Attn: Mike Olson)
FWS; Columbia, MO (Attn: Jane Ledwin)
FWS; Manhattan, KS (Attn: Dan Mulhern)

Subsequent Coordination with the State Fish and Game Agencies

Follow-up Email sent 1 April 2004 to IA, MO, and NE:

From: Laux, Eric A NWO
Sent: Thursday, April 1, 2004 7:00AM
To: Angi Bruce IDNR - Angi.bruce@dnr.state.ia.us (712) 769-2587
Mark Brohman NGPC - mbrohman@ngpc.state.ne.us (402) 471-5539
Brian Canaday MDC - Brian.Canaday@mdc.mo.gov (573)522-4115 x3371

This is a followup to the March 16 email and phone call, and my phone call yesterday.

I just wanted to touch base with you to see if [your agency] had any specific comments regarding the Shallow Water Habitat Projects that will be implemented by July 1 (per initial phone call and follow-up email on 16 March). An informal phone call or email with your comments is fine, or if sending letter, please fax or scan and email so that I may finalize the EA by Apr 6th. Again, my specific request was regarding Dike Lowering and Chevron construction with 6 sites from Sioux City, IA to Nemaha, NE. Specifically, there is one site on the Missouri River on the Iowa side, 4 others lie on the NE side between IA and NE, and the last one lies between Missouri and Nebraska on the Nebraska Side. The sites include the inside bend portions of Snyder Bend in Woodbury County, IA (Left Descending Bank River Mile (LDB RM) 715.2-714.7); Winnebago Bend in Thurston County, NE, (LDB RM 710.0-708.7); Desoto Bend and Boyer Bend in Washington County, NE, (RDB RM 644.0-642.0, and RDB RM 637.0-634.0 respectively); Tobacco Island Bend in Cass County, NE, (RDB RM 589.0-586.2); and Langdon Bend in Nemaha County, NE, (RDB RM 531.7-529.0)

As you know, there are other projects in the Omaha District that are also constructing shallow water habitat that you have also been contacted on, including California, Tyson, and Soldier bend dredging and dike notching.

Feel free to give me a call and discuss any comments that [your agency] may have.

Eric A. Laux
Biologist
USACE Omaha District
ATTN: CENWO-PM-AE
106 South 15th Street
Omaha, NE 68102-1618
Office: 402-221-7186
Fax: 402-221-4886
e-mail: eric.a.laux@nwo02.usace.army.mil

Missouri Response 1 April, 2004:

From: Brian Canaday [<mailto:Brian.Canaday@mdc.mo.gov>]
Sent: Thursday, April 01, 2004 3:47 PM
To: Laux, Eric A
Subject: Re: shallow water habitat

We agree with the work. I say move forward! Thanks

Brian D. Canaday
Policy Coordinator
Missouri Department of Conservation
2901 West Truman Blvd
Jefferson City, Missouri 65102
573-522-4115 *3371
573-526-4495 (fax)
Brian.Canaday@mdc.mo.gov

Nebraska's Response 6 April 2004:

From: Mark Brohman [<mailto:mbrohman@ngpc.state.ne.us>]
Sent: Tuesday, April 06, 2004 3:43 PM
To: 'Laux, Eric A NWO'
Cc: zuerlein@ngpc.state.ne.us; gmestl@ngpc.state.ne.us; 'Carey Grell'; 'Albrecht Frank'; shuedtke@ngpc.state.ne.us
Subject: Shallow Water Habitat
Eric,

The Nebraska Game and Parks Commission will provide written comments to pending 404 permits for Missouri River projects. This e-mail is to provide timely comments for the Shallow Water Habitat Projects that will begin July, 2004, for your EA that you are finalizing today. Our agency does not have any immediate concerns about the dike lowering and chevron construction with regard to endangered species. We would ask that the Corps survey the immediate area, within .5 mile, of each construction site for nesting bald eagles, prior to construction activity. This can easily be accomplished by staff looking for nests and the presence of adult bald eagles. If active nests are discovered, please notify myself at 402-471-5599 or John Dinan of our staff at 402-471-5440. Construction activity can disturb nesting bald eagles and cause them to abandon a nesting site. We know of two eagle nest sites near proposed sites. We have record of a bald eagle nest across the lake from [REDACTED]. The U.S. Fish and Wildlife Service monitors this nesting site and could provide additional information. It appears the construction at this site in 2004 will be out of the "disturbance zone". We also have record of a nest [REDACTED]. Once again it appears this nest is out of the "disturbance zone" for this project proposed for 2005.

Our staff has made casual observations and taken measurements behind and around dike notches and chevrons constructed last year. Our agency is concerned that the habitat created will replace other types of existing beneficial habitat. Deep still water may be replaced with shallow submerged sandbars. The newly created habitat may or may not provide beneficial habitat for the pallid sturgeon and should be measured to insure it is meeting project objectives. If you have any questions, please contact me.

Mark Brohman,
Administration Division

Iowa's Response and Recommendations 5 April 2004:

E-Mail from Angi Bruce, SW District Wildlife Supervisor, Attachment to email received on 5 April 2004 follows:

Concerns

- 1) John Remus, Chief Engineer on project, did not know for certain how far the bank would erode back. His best guess was 150 ft, or less then 200 ft. This raises a red flag to us about their knowledge of these modifications. The USACE has never done these before. They have placed chevrons in the river near Hamburg bend but have not combined them with the dike modification into the bank.
- 2) When reviewing the chevrons placed in the river near Hamburg bend, several items were discussed. These chevrons need to be placed closer to the bank. They divert water into the bank as designed, however the water lost velocity due to the distance and therefore had very little pressure left for erosion. Very little bank erosion was occurring, the rate was approx. 1 foot per year. The angle of the chevrons needs to be evaluated. Of the ones in place, it appeared that the ones at a greater angle were more effective. These chevrons may also be more effective when they combine them with the dike modifications.
- 3) The chevrons will be placed at a height to make them the most effective during summer flows. If the river's flows are changed and lower summer flows are implemented, this project may fail.
- 4) These chevrons were placed just at or slightly below the water surface, becoming a safety concerns for boaters.

Positives

- 1) Sandbars were forming behind the chevrons, which will create good wildlife habitat.
- 2) When discussing this project with the USACE, the combination of chevrons and dike modifications will create a continuous eroded bank (approx. 200 ft.) and sand bar deposits behind the chevrons. This type of habitat is good for pallid sturgeons and if the planned results occur, should be successful.

Table of Site Specific Comments from Iowa DNR.

Project Location	River Mile	Ownership		Proposed Activity	Approved by Iowa	Comments
		State	Corps			
Snyder Bend	715.2-714.7		X	Major Dike Modification, 5 lowered dikes, 3 Chevrons	Yes	This will eroded the entire back 200 ft. into the woodland.
Upper Decatur Bend	690.9-689.3	X		Dike Notching, 12 type B	No	Concern for restoration structures in area
Lower Louisville Bend	683.2-681.7	X		Dike Notching, 11 type B	No	Due to limited width of state area and risk of cutting into the restored wetland

						cutting into the restored wetland.
Lower Little Sioux Reach (Deer Island)	672.5-670.5	X		Dike Notching, 14 type B	Yes	672.1 –670.5 only, due to wildlife area parking lot
Tyson Bend	654.5-653.0	X		Dike Notching, 7 type B	Yes	654.3-654.9 only, due to wildlife area parking lot and boat ramp
Nottleman Island	585.9-582.8		X	Dike Notching, 15 type B	No	Will jeopardize interior levee that protect adjacent landowner's cropland.
Auldon Bar	578.8-576.8		X	Dike Notching, 15 type B	Yes	
Copeland Bend	569.2-565.3	X	X	Dike Notching, 21 type B	Yes	Yes, for state ground, EWP easement on Corps ground
Nebraska Bend	562.7–561.5		X	Dike Notching, 8 type B	Yes	Near levee district levee, 562.2-562.7 only, due to pitch point of levee
Solder Bend	660.3	X		Dredging 160,00 cubic yards (25 acres)	Yes	With guidance from us on location and depths.
Tyson Bend	653	X		Dredging 160,000 cubic yards (25 acres)	Yes	With plans for opening the entire chute and guidance from us on location and depths.
California Bend	649.5	X		Dredging 100,000 cubic yards (15 acres)	Yes	With guidance from us on location and depths.

COE Response to IA DNR:

John Remus contacted Angi Bruce on 5 April 2004 per the e-mailed comments. He mentioned that the concern about certainty in the resulting physical changes at each site is an understandable one. Uncertainty is exactly the reason the Corps will be monitoring the sites pre- and post-construction. Monitoring will allow the Corps to identify modifications may be needed in the future, and so future projects will be constructed based on new information as it is gained. Per John Remus, Angi will re-consult with her staff on Upper Dekatur and Lower Louisville Bend projects. John mentioned that specific design considerations were made at these sites pertaining to concerns that the Corps understood Iowa DNR to have. At Nottleman Island, the Corps takes the comment on Iowa's disapproval under advisement, but the Corps plans to maintain the current project design at that site.

APPENDIX E

PHYSICAL MONITORING PLANNED FOR SELECT REACHES OF THE SHALLOW WATER HABITAT PROJECTS

Proposed survey schedule for the projects that are on the list shown in General Grisoli's letter to Robyn Thorson (App. A). This plan reflects the Omaha District capability to complete the surveys. Locations can be changed, however, additional locations can not be added.

1. Upper and Lower Hamburg Bend. This is the site of major dike modifications completed in 2003. We already have a pre-construction survey and will move out immediately with a post construction survey. This will cover nearly 6 miles of river. The data collection effort will consist of both bathymetry and velocity data. We will develop a DTM and a velocity contour map that can be compared to the pre-construction survey.

2. Desoto Bend and Tobacco Island. Both of these sites are areas where we will be doing major dike modifications in 2004. The proposal is to select one dike-chevron-dike complex and conduct a pre-construction survey that would include both bathymetry and velocity data. After construction, bi-weekly bathymetric surveys would be obtained at index ranges to monitor the rate at which changes are occurring. Once the site has undergone a significant amount of change a complete post construction survey will be obtained that will try to duplicate the pre-construction data collection effort. DTMs and velocity contour maps will be developed and compared.

3. Dike Notching. At each notch indicated on the table below, a series of cross sections will be obtained upstream and downstream of the dike. Cross sections will be approximately perpendicular to the general flow line of the river. The first upstream cross section will be approximately 25 feet upstream of the dike and the second and third cross section will be spaced at 50-foot intervals. The first downstream cross section will be approximately 25 feet downstream of dike and the cross sections will be spaced out at 50 feet intervals for a total of 6 cross sections. The downstream spacing may be adjusted to fit field conditions if needed. A longitudinal profile will be obtained from the most upstream cross section through the notch to the most downstream cross section. This survey should provide an accurate estimate of the aerial extent of riverbed form changes. Velocity data will be collected at three points along each cross section.

4. Backwater Dredging. No special surveys will be gathered for these sites. The pre- and post construction surveys that are required from the construction contractor will suffice for determining the acres of SWH.

Missouri River, Sioux City to Rulo, FY 2004-05 Major Dike Modification Plan									
Major Dike Modification Projects:									
Project Site	River Miles	River Bank	State	# of Structures Lowered	Material Removed CY	# of New Chevrons	New Stone (Tons)	New SWH Acres	Completion Date
2004									
Desoto Bend	644.0-642.0	Right	Nebraska	12	13008	8	5011	25-30	01-Jul-04
Boyer Bend	637.0-634.0	Right	Nebraska	20	25680	8	7398	30-60	01-Jul-04
Tobacco Islands (Bend)	589.0-586.2	Right	Nebraska	16	20544	8	6576	15-20	01-Jul-04
Langdon Bend	531.7-529.0	Right	Nebraska	20	33965	10	7650	15-18	01-Jul-04
Snyder Bend	715.2-714.7	Left	IA/NE	5	6520	3	2466	20-25	01-Jul-04
Winnebago Bend	710.0-708.7	Left	Nebraska	12	15408	5	4110		01-Jul-04
Total for 2004				85	115125	40	33211	105-135	
2005									
Glovers Point Bend	713.5-710.7	Right	Nebraska	32	49925	15	14914	30-60	01-Jul-05
Blackbird Bend	697.3-693.7	Left	IA/NE	31	41200	15	9820	70-95	01-Jul-05
Tyson Bend	654.6-653.0	Left	Iowa	27	34668	13	10686	15-20	01-Jul-05
Van Horns Bend	576.5-574.5	Right	Nebraska	8	10272	4	3288	15-20	01-Jul-05
Upper Copeland Bend	569.0-565.5	Left	Iowa	26	18361	7	7220	30-60	01-Jul-05
Upper and Lower Deroin Bend	519.8-516.4	Left/Right	MO/NE	14	16871	7	4700	30-60	01-Jul-05
Total for 2005				138	171297	61	50628	190-315	

The proposal is to select one dike-chevron-dike complex (at each of the site high lighted above) and conduct a pre-construction survey that would include both bathymetry and velocity data. After constuction, bi-monthly bathymetric surveys would be obtained at index ranges to monitor the rate at which changes are occurring. Once the site has under gone a significant amount of change a complete post construction survey will be obtain that will try to duplicate the pre-construction data collection effort. DTMs and velocity contour maps will be developed and compared.

Missouri River, Sioux City to Rulo, FY 2004 Dike Notching Plan

Project Site	River Miles	River Bank	State	Dike Number	US/DS River Mile	# of Notches	Material Removed CY	Notch Type
Upper Decatur Bend	691.0-689.3	Left	IA			12	4800	B
This bend is a relatively sharp bend with a lot of dikes spaced close together, and is representative of a number of bends that are likely to be developed in the future. This bend is also in the degradation reach between Sioux City and the Platte River. The uniformness of the bend does not require more than the two dikes to be surveyed.				743.89	690.9			
				743.79				
				743.75				
				743.7				
				743.68				
				743.66				
				743.64				
				743.62				
				743.54				
				743.43				
				743.36				
				743.29	689.3			
Lower Louisville Bend	683.2-681.7	Left	IA			11	4400	B
This bend is fairly flat with a lot of dikes spaced close together. While not really representative of any other bend in the reach between Sioux City and Omaha this bend is representative of a number of other areas/bend complexes that have potential for development (i.e. Lower Decatur Bend). The uniformness of the bend does not require more than the two dikes to be surveyed.				734.8	682.95			
				734.7				
				734.6				
				734.49				
				734.32				
				734.25				
				734.08				
				733.92				
				733.76				
				733.7				
				733.63	681.7			
Lower Little Sioux Reach	672.5-670.5	Left	IA			14	5600	B
This bend is average length, average radius, average dike density for this reach if the river. Data collected here is probably more transportable to other reaches and bend than the upper two bend, hence the three dikes.				725.2	672.4			
				725.3-B				
				724.9				
				725.3-A				
				724.46				
				724.37				
				724.2				
				724.1				
				724.05				
				724				
				723.8				
				723.75				
				723.6				
				723.53	670.5			
Tyson Bend	654.5-653.0	Left	IA			7	2800	B
				704	655.4			
				703.78				
				703.68				
				702.98				

				702.88				
				702.78				
				702.65	653.1			
Nottleman Island	585.9-582.8	Left	IA			15	6000	B
This is a long flat bend, with lots of dikes and a history of thalweg meander, indicating that the potential for change is relatively high. This bend is also representative of other potential bends (i.e. Copeland Bend).				628.1	584.8			
				627.87				
				627.82				
				627.51				
				627.45				
				627.25				
				627.15				
				626.95				
				626.9				
				626.82				
				626.75				
				626.6				
				626.37				
				626.35				
				626.33	582.8			
Aulden Bar	578.8-576.8	Left	IA			15	6000	B
This bend is a littel shorter and sharper than average for this reach of the river, but the dike density is average and the proposed sampling would likely provide the most transportable data.				632.31	578.7			
				623.25				
				623.15				
				623.04				
				623				
				622.93				
				622.88				
				622.83				
				622.62				
				622.5				
				622.3				
				622.19				
				622.15				
				622.05				
				621.89	576.8			
Copeland Bend	569.2-565.3	Left	IA			21	8400	B
				614.95	569.2			
				614.85				
				614.77				
				614.7-B				
				613.9				
				613.8				
				613.6				
				613.45				
				613.3				
				613.1				
				613				
				612.9				
				612.7				
				612.5				

				612.2				
				612				
				611.85				
				611.75				
				611.55				
				611.4				
				611.2	565.4			
Nebraska Bend	562.7-561.5	Left	IA			8	3200	B
				608.5	562.7			
				608.3				
				608.07				
				607.92				
				607.8				
				607.69				
				607.6				
				607.4	561.5			
						17	6800	B
U/L Deroin and Indain Cave B.	519.8-516.2	Left	MO	561.15	519.7			
These bend form a series of short flat bends which are duplicated at a number of locations in in the reach between Sioux City and Rulo. Bend complexes such as these tend to be sensitive to structure modification and therefore would indicate a greater potential for changes.				561				
				560.9				
				560.75				
				560.6				
				560.55				
				560.35				
				560.3				
				560.2				
		Right	NE	559.55				
				559.5				
				559.45				
		Left	MO	559				
				558.6				
				558.45				
				558.31				
				558.2	516.3			
Cottier Bend	509.2-508.5	Left	MO			2	800	B
				549.55	509.2			
				548.61	508.4			
Total						122	48800	

At each notch indicated above (**high lighted in green**), a series of cross sections will be obtained upstream and downstream of the dike. Cross sections will be approximately perpendicular to the general flow line of the river and will extend from high bank to high bank. The first upstream cross section will be approximately 25 feet upstream of the dike and the second and third cross sections will be spaced at 50-foot intervals further upstream. The first downstream cross section will be approximately 25 feet downstream of dike and the cross sections will be spaced at 50 feet intervals downstream for a total of 6 cross sections. The downstream spacing may be adjusted to fit field conditions as needed. Two longitudinal profiles will be obtained. The first longitudinal profile will be obtained from the most upstream cross section through the notch to the most downstream cross section. The second longitudinal profile will be approximately parallel to the first profile and will extend from the most upstream to the most downstream cross section and will be immediately riverward of the end of the dike. This survey should provide an accurate estimate of the aerial extent of river bed form changes. Velocity data will be collected at four points along each cross section. The locations are; along a line approximately parallel to the edges of the notche (two locations), at a point approximately equal to the end of the dike, and approximately 1/2 a dike length riverward of the end of dike. At each site a minimum of four velocity measurements will be obtained in depths of less than 5 feet. At each location that velocity data is obtained, the velocity at the river bed and at the mid point of the water column shall be reported.

APPENDIX F

**DEPARTMENT OF ARMY SECTION 404
NATION WIDE #27 AUTHORIZATION DOCUMENTATION**

CENWO-OD-RNE(1145)

30 March 2004

MEMORANDUM FOR CENWO-ED-HF (John Remus)

SUBJECT: Missouri River, Major Dike Modifications—Snyder Bend (715.2-714.7)

1. We have reviewed your request for Department of the Army authorization for lowering 5 dike structures and the construction of 3 chevrons at the locations listed below. The work will be carried out in accordance with plans received on March 23, 2004.

Site #1—NE ¼ Section 26, Township 86 North, Range 47 West, Woodbury County, Iowa, River Mile 715.9 left bank.

Site #2—NE ¼ Section 26, Township 86 North, Range 47 West, Woodbury County, Iowa, River Mile 715.7

Site #3—NW ¼ Section 25, Township 86 North, Range 47 West, Woodbury County, Iowa, River 715.5

2. Based on the information you provided, this office has determined that your work is authorized by the Department of the Army Nationwide Permit No. 27, found in the January 15, 2002 Federal Register (Vol. 67, No. 10, Part II), Issuance of Nationwide Permits. Enclosed is a fact sheet that fully describes this Nationwide Permit and lists the General Conditions that must be adhered to for this authorization to remain valid.

The authorization for this Nationwide Permit will include the following Special Conditions:

1. Clearing of vegetation shall be limited to that which is absolutely necessary for construction of the project and the excess materials from the project shall not be disposed in a wetland area.

2. Disturbed areas shall be revegetated.

3. Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.

4. You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the

-2-

limitations of the applicable Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.

5. In compliance with General Condition 14, the attached Compliance Certification form must be signed and returned to the address listed upon completion of the authorized work and any required mitigation.

6. This verification will be valid until **March 30, 2006**.

7. Should you at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, you must immediately notify this office.

8. If you have any questions concerning this determination or jurisdiction, please feel free to contact Matt Wray at (402) 896-0896 and reference Nationwide Permit No. **NE 2004-10374**.

Sincerely,


Michael Rabbe
Nebraska State Program Manager

Enclosures

Copy Furnished:

IDNR (Christina Schwake)
CENWO-PM-AE (Eric Laux)

COPY

CENWO-OD-RNE(1145)

30 March 2004

MEMORANDUM FOR CENWO-ED-HF (John Remus)

SUBJECT: Missouri River, Major Dike Modifications—Desoto Bend (644.0-642.0)

1. We have reviewed your request for Department of the Army authorization for lowering 12 dike structures and the construction of 6 chevrons at the locations listed below. The work will be carried out in accordance with plans received on March 18, 2004.

Site #1—SE ¼ Section 22, Township 18 North, Range 12 East, Washington County, Nebraska, River Mile 643.9 right bank

Site #2—SW ¼ Section 23, Township 18 North, Range 12 East, Washington County, Nebraska, River Mile 643.6 right bank

Site #3—NW ¼ Section 26, Township 18 North, Range 12 East, Washington County, Nebraska, River Mile 643.3 right bank

Site #4—NE ¼ Section 26, Township 18 North, Range 12 East, Washington County, Nebraska, River Mile 643.0 right bank

Site #5—SE ¼ Section 26, Township 18 North, Range 12 East, Washington County, Nebraska, River Mile 642.8 right bank

Site #6—NE ¼ Section 26, Township 18 North, Range 12 East, Washington County, Nebraska, River Mile 642.5 right bank

2. Based on the information you provided, this office has determined that your work is authorized by the Department of the Army Nationwide Permit No. 27, found in the January 15, 2002 Federal Register (Vol. 67, No. 10, Part II), Issuance of Nationwide Permits. Enclosed is a fact sheet that fully describes this Nationwide Permit and lists the General Conditions that must be adhered to for this authorization to remain valid.

The authorization for this Nationwide Permit will include the following Special Conditions:

1. Clearing of vegetation shall be limited to that which is absolutely necessary for construction of the project and the excess materials from the project shall not be disposed in a wetland area.
2. Disturbed areas shall be revegetated.

-2-

3. Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.
4. You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.
5. In compliance with General Condition 14, the attached Compliance Certification form must be signed and returned to the address listed upon completion of the authorized work and any required mitigation.
6. This verification will be valid until **March 30, 2006**.
7. Should you at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, you must immediately notify this office.
8. If you have any questions concerning this determination or jurisdiction, please feel free to contact Matt Wray at (402) 896-0896 and reference Nationwide Permit No. **NE 2004-10337**.

Sincerely,


for Michael Rabbe
Nebraska State Program Manager

Enclosures

Copy Furnished:

NDEQ (Terry Hickman)
IDNR (Christina Schwake)
CENWO-PM-AE (Eric Laux)

CENWO-OD-RNE(1145)

30 March 2004

MEMORANDUM FOR CENWO-ED-HF (John Remus)

SUBJECT: Missouri River, Major Dike Modifications—Boyer Bend (637.0-634.0)

1. We have reviewed your request for Department of the Army authorization for lowering 20 dike structures and the construction of 9 chevrons at the locations listed below. The work will be carried out in accordance with plans received on March 25, 2004.

Site #1—SE ¼ Section 18, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 636.9 right bank

Site #2— SW ¼ Section 17, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 636.4 right bank

Site #3— NW ¼ Section 20, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 636.2 right bank

Site #4— NE ¼ Section 20, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 635.9 right bank

Site #5— NE ¼ Section 20, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 635.5 right bank

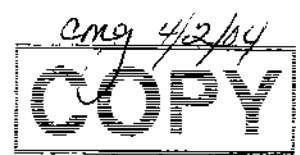
Site #6— SE ¼ Section 20, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 635.1 right bank

Site #7— NE ¼ Section 29, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 634.9 right bank

Site #8— NE ¼ Section 29, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 634.5 right bank

Site #9—SE ¼ Section 29, Township 17 North, Range 13 East, Washington County, Nebraska, River Mile 634.2

2. Based on the information you provided, this office has determined that your work is authorized by the Department of the Army Nationwide Permit No. 27, found in the January 15, 2002 Federal Register (Vol. 67, No. 10, Part II), Issuance of Nationwide Permits. Enclosed is a fact sheet that fully describes this Nationwide Permit and lists the General Conditions that must be adhered to for this authorization to remain valid.



Eric

-2-

The authorization for this Nationwide Permit will include the following Special Conditions:

1. Clearing of vegetation shall be limited to that which is absolutely necessary for construction of the project and the excess materials from the project shall not be disposed in a wetland area.
2. Disturbed areas shall be revegetated.
3. Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.
4. You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.
5. In compliance with General Condition 14, the attached Compliance Certification form must be signed and returned to the address listed upon completion of the authorized work and any required mitigation.
6. This verification will be valid until **March 30, 2006**.
7. Should you at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, you must immediately notify this office.
8. If you have any questions concerning this determination or jurisdiction, please feel free to contact Matt Wray at (402) 896-0896 and reference Nationwide Permit No. **NE 2004-10391**.

Sincerely,

John Moeschen
for Michael Rabbe
Nebraska State Program Manager

Enclosures

Copy Furnished:
NDEQ (Terry Hickman)
IDNR (Christina Schwake)
CENWO-PM-AE (Eric Laux)

CENWO-OD-RNE(1145)

30 March 2004

MEMORANDUM FOR CENWO-ED-HF (John Remus)

SUBJECT: Missouri River, Major Dike Modifications—Tobacco Islands (589.0-586.2)

1. We have reviewed your request for Department of the Army authorization for lowering 16 dike structures and the construction of 8 chevrons at the locations listed below. The work will be carried out in accordance with plans received on March 18, 2004.

Site #1—NW ¼ Section 6, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 588.5 right bank

Site #2—NW ¼ Section 6, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 588.2 right bank

Site #3—SE ¼ Section 6, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 587.8 right bank

Site #4—SE ¼ Section 6, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 587.6 right bank

Site #5—NW ¼ Section 7, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 587.4 right bank

Site #6—NW ¼ Section 7, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 587.1 right bank

Site #7—SW ¼ Section 7, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 587.0 right bank

Site #8—SW ¼ Section 7, Township 12 North, Range 14 East, Cass County, Nebraska,
River Mile 586.7 right bank

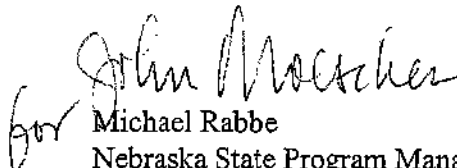
2. Based on the information you provided, this office has determined that your work is authorized by the Department of the Army Nationwide Permit No. 27, found in the January 15, 2002 Federal Register (Vol. 67, No. 10, Part II), Issuance of Nationwide Permits. Enclosed is a fact sheet that fully describes this Nationwide Permit and lists the General Conditions that must be adhered to for this authorization to remain valid.

-2-

The authorization for this Nationwide Permit will include the following Special Conditions:

1. Clearing of vegetation shall be limited to that which is absolutely necessary for construction of the project and the excess materials from the project shall not be disposed in a wetland area.
2. Distributed area shall be revegetated.
3. Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.
4. You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.
5. In compliance with General Condition 14, the attached Compliance Certification form must be signed and returned to the address listed upon completion of the authorized work and any required mitigation.
6. This verification will be valid until **March 30, 2006**.
7. Should you at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, you must immediately notify this office.
8. If you have any questions concerning this determination or jurisdiction, please feel free to contact Matt Wray at (402) 896-0896 and reference Nationwide Permit No. **NE 2004-10355**.

Sincerely,


for Michael Rabbe
Nebraska State Program Manager

Enclosures

Copy Furnished:
NDEQ (Terry Hickman)
IDNR (Christina Schwake)
CENWO-PM-AE (Eric Laux)

CENWO-OD-RNE(1145)

30 March 2004

MEMORANDUM FOR CENWO-ED-HF (John Remus)

SUBJECT: Missouri River, Major Dike Modifications—Langdon Bend (531.7-529.0)

1. We have reviewed your request for Department of the Army authorization for lowering 20 dike structures and the construction of 10 chevrons at the locations listed below. The work will be carried out in accordance with plans received on March 18, 2004.

Site #1—NW $\frac{1}{4}$ Section 22, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 531.5 right bank

Site #2— NW $\frac{1}{4}$ Section 22, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 531.35 right bank

Site #3— SW $\frac{1}{4}$ Section 22, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 531.1 right bank

Site #4— SE $\frac{1}{4}$ Section 22, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 530.8 right bank

Site #5— SE $\frac{1}{4}$ Section 22, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 530.6 right bank

Site #6—NW $\frac{1}{4}$ Section 27, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 530.4 right bank

Site #7— NW $\frac{1}{4}$ Section 27, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 530.2 right bank

Site #8— NW $\frac{1}{4}$ Section 27, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 529.95 right bank

Site #9— SW $\frac{1}{4}$ Section 27, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 529.65 right bank

Site #10—SE $\frac{1}{4}$ Section 28, Township 4 North, Range 16 East, Nemaha County, Nebraska, River Mile 529.35 right bank

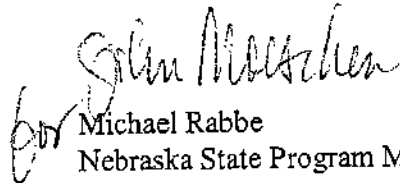
2. Based on the information you provided, this office has determined that your work is authorized by the Department of the Army Nationwide Permit No. 27, found in the January 15, 2002 Federal Register (Vol. 67, No. 10, Part II), Issuance of Nationwide Permits. Enclosed is a fact sheet that fully describes this Nationwide Permit and lists the General Conditions that must be adhered to for this authorization to remain valid.

The authorization for this Nationwide Permit will include the following Special Conditions:

- 1. Clearing of vegetation shall be limited to that which is absolutely necessary for construction of the project and the excess materials from the project shall not be disposed in a wetland area.**
- 2. Disturbed areas shall be revegetated.**
3. Although an individual Department of the Army permit will not be required for the project, this does not eliminate the requirement that you obtain any other applicable Federal, state, tribal or local permits as required. Please note that deviations from the original plans and specifications of your project could require additional authorization from this office.
4. You are responsible for all work accomplished in accordance with the terms and conditions of the Nationwide Permit. If a contractor or other authorized representative will be accomplishing the work authorized by the Nationwide Permit in your behalf, it is strongly recommended that they be provided a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable Nationwide Permit. Any activity that fails to comply with all of the terms and conditions of the Nationwide Permit will be considered unauthorized and subject to appropriate enforcement action.
5. In compliance with General Condition 14, the attached Compliance Certification form must be signed and returned to the address listed upon completion of the authorized work and any required mitigation.
6. This verification will be valid until **March 30, 2006**.
7. Should you at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, you must immediately notify this office.

8. If you have any questions concerning this determination or jurisdiction, please feel free to contact Matt Wray at (402) 896-0896 and reference Nationwide Permit No. **NE 2004-10356**.

Sincerely,


Michael Rabbe
Nebraska State Program Manager

Enclosures

Copy Furnished:

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IDNR (Christina Schwake)
CENWO-PM-AE (Eric Laux)